

MARINE REVIEW.

VOL. XIII.

CLEVELAND, O., FEBRUARY 20, 1896.

No. 8.

Another Big Steel Ship—Ship Yard Matters.

Mr. W. I. Babcock of the Chicago Ship Building Co. informs the REVIEW that he has just closed a contract with the Wolvin syndicate of Duluth for a steamer to be delivered at the opening of navigation in 1897, of the following dimensions: 406 feet keel, 48 feet beam and 28 feet deep. She will be practically a duplicate of the steamer Zenith City, built by the Chicago company for the same people, and will be constructed from the same model. The machinery will be the same and probably the boilers, although the matter of boilers is not definitely decided yet. The Zenith City has water tube boilers made by the Babcock & Wilcox company.

The shipping and lighterage department of the Standard Oil Co. now has in the hands of the lake ship builders plans and specifications for a tow barge, designed especially for lake work, and which is to be 254 feet by 40 feet by 23 feet, with a capacity of 750,000 gallons on 14 feet draught. The vessel is to have a four-masted schooner rig, with deck houses and other appliances the same as on the barges now on the lakes, known as S. O. Co. No. 75 and S. O. Co. No. 76. This new barge is to take the place of No. 75 and No. 76, which have a capacity of only 350,000 gallons each, and which are only 170 by 33 by 17 feet. The two barges now in service were originally built for coast work, and will be transferred to the coast next fall. In the construction of the new vessel there will be no departure from the practice followed in the two already built, except dispensing with the longitudinal bulkhead which runs through the center of these two barges and substituting a water bottom similar to that which is common in lake practice.

Inspectors for the twelve 4,000-ton vessels that are being built in different lake ship yards for Mr. John D. Rockefeller are: One steamer at yard of Cleveland Ship Building Co. and two at Detroit Dry Dock Co.'s plant, Wyandotte, Mr. Sinclair Stewart of the U. S. Standard Register of Shipping, New York; two steamers at yard of Globe Iron Works Co., Cleveland, together with a steamer and two steel tow barges at Wheeler & Co.'s yard, West Bay City, John Haug of Philadelphia; one steamer and one tow barge at American Steel Barge Co.'s Works, West Superior, as well as two tow barges at South Chicago, Capt. F. D. Herriman of the Bureau Veritas, Chicago.

Following are names selected for some of the new vessels now under way in lake ship yards: Eddy-Shaw steamer at West Bay City, City of Bangor; Roby Transportation Co.'s steamer at same yard, L. C. Waldo; North Western Transportation Co.'s steel tow barge at South Chicago, Geo. E. Hartnell; C. W. Elphicke & Co.'s steamer at South Chicago Geo. N. Orr; Minnesota Steamship Co.'s steamer at South Chicago, Mari-copa; two steel tow barges for Minnesota Steamship Co. at South Chicago, Manda and Martha; American Steel Barge Co.'s whaleback steamer at West Superior, Frank Rockefeller.

The proposition of Rieboldt, Wolter & Co. to remove their ship yard plant from Sheboygan to Sturgeon Bay, if they are given a site near the east entrance to the ship canal and a bonus of \$6,000, has met with a favorable reception. The site has been voted to the firm and subscriptions for the accompanying bonus are now being solicited. The site chosen is on a bed of limestone rock which will enable Rieboldt, Wolter & Co. to put in a substantial stationary dry dock of the largest size simply by drilling and blasting.

Two launches are scheduled for Saturday of this week. At the ship yard of F. W. Wheeler & Co., West Bay City, Mich., the Roby Transportation Co.'s steamer L. C. Waldo will very probably go into the water and at the Globe yard, Cleveland, everything is in readiness for the launch of the new Mutual line steamer. Both boats will belong to the largest class of ships afloat on the lakes.

Probably the largest repair job ever executed on the lakes, has just been finished by the Detroit Dry Dock Co. on the Northern Steamship Co.'s steamer Northern Wave, which stranded on rocks near Sand Beach, while trying to make that harbor during a storm in November last. It is reported that the cost of repairs will exceed \$75,000.

Upon the completion of Wheeler & Co.'s ship yard addition, two or three weeks hence, the firm will be employing, with eight big steel vessels under contract, about 1,500 men.

It is said that the German government has decided upon the construction of twenty torpedo boat destroyers of 30 knots speed, and that orders for twelve of them have been placed in England.

Duluth Freights—Cleaning Up Coal Stocks.

Duluth, Minn., Feb. 19.—The freight situation here is thus described in a letter sent out by one of the leading brokerage firms: "Shippers say they will pay 3 cents for two trips, but they are not very active in their inquiries. We have ascertained on very good authority that no wheat has been sold in this market for eastern shipment within two weeks, consequently we incline to the opinion that the inquiry now being made for tonnage is purely of a speculative nature on the part of the shippers. We think it possible that a cargo or two might be secured at 3½ cents, shipment within ten days after the opening of navigation, but we are not prepared to make an offer of this kind. There are 14,000,000 bushels of all kinds of grain in store here, and probably 4,000,000 bushels more will be received before the opening of navigation. At the opening of navigation in 1895 the amount in store was 12,000,000 bushels. The cold weather prevailing through the past week has had a stimulating influence in the matter of coal shipments, and we are still very strongly of the opinion that by the opening of navigation there will be no coal on the docks at Duluth or West Superior; at any rate, the quantity will be very small. Considerable ice has been formed during the week, and more is making every day."

Chicago Grain Freights.

Chicago, Ill., Feb. 19.—The Buffalo corn rate dropped to 2 cents Tuesday, two charters being made at that price. Some vessel agents have advised their principals to take their boats off the market, believing that with a rate of 1½ cents at the opening of navigation, they will be better off than to take 2 cents now. Extra tow bills and other expenses incidental to loading for winter storage, they say, will more than make up the difference. The outlook in grain is far from what vessel men had hoped for at this stage of the winter season.

The little excursion steamer Belle has been sold by Henry J. O'Hara to Albert C. Major of Duluth for \$3,500. She will go to Duluth next spring.

The dissolved firm of Palmer, Cook & Calbick is dividing all up. Calbick will retain the old office on Sherman street, while Cook goes in next to Carr & Blair's office.

Novel Design of Marine Engine.

A new design of marine engine of considerable novelty, and apparently possessing some solid advantages over the ordinary type of inverted direct-acting engines so long in use, has been submitted recently to a number of the leading engineering firms on the Clyde. The inventor and patentee is Mr. Wigzell, whose name is already favorably known in connection with the Cooper-Wigzell sea-sounding apparatus. The disposition of the cylinders in the new type of engine is at right angles to the crank-shaft in a three-cylinder triple expansion engine, but there are six pistons in place of three. Steam is admitted to the cylinder about its mid-length, and expanding between two pistons forces them apart, one with its piston-rod going downwards to the crank, the other with its piston-rod going upwards through the top of cylinder, but by an ingenious arrangement of T-arms having a return action on the cranks, which are only three in number in vessels up to 3,000 horse power. The patentee claims for his engine that greater power can be attained with smaller diameter of cylinders than now obtains in practice, perfect balance, a practically uniform power throughout its revolutions, friction of main bearings greatly reduced, the crank-shaft being almost a floating one, and that for the same power developed much less space is required. Some engineers to whom the working of this engine has been shown consider it well adapted for high piston speeds, and on account of the diminished space occupied, it may with advantage be adopted in high-speed craft, such as swift steam yachts, torpedo boats, and light cruisers, and also for electric light purposes.—Fairplay, London.

A meeting of Philadelphia members of the Association of American Draughtsmen was held Saturday, Feb. 15, at which it was proposed to form a chapter in that city. A committee was appointed to frame by-laws. The next meeting will be held Saturday, Feb. 29, when will be discussed plans for furnishing draughting rooms in the central portion of the city, that the American draughtsmen of all trades may have a place where they may not only transact private business, but also meet their brother draughtsmen in social intercourse.

Three Cylinder Compound Engines.

A peculiar type of engines for a paddle steamer is illustrated on this page. Although adopting three cylinders, the builders of these engines have not arranged for the three stage expansion now increasing in favor for paddle steamers. The engines may be styled three cylinder compound. They were built by John Penn & Sons of Greenwich, England, for the Southeastern Railway Co's paddle steamer *Duchess of York*, which is engaged in the English channel service.

The working boiler pressure is 120 pounds to the square inch. The two low pressure cylinders are placed on either side of the high pressure cylinder, and the cranks are set to work at the same angle, while that of the high pressure cylinder is at 120 degrees with them. The high pressure cylinder is 48 inches in diameter, and both the low pressure cylinders are 68 inches, the stroke being 6 feet. As shown on the sectional plan (Fig. 2), the high-pressure cylinder has a valve of the piston type, while both low pressure cylinders have flat valves on the off-side of the

The boilers, four in number, are of steel, and 13 feet 8 inches in diameter by 9 feet 10 inches long. They are single-ended, each having three furnaces 3 feet 6 inches in mean diameter. They are of the ordinary return-tube type. The tubes are $2\frac{1}{2}$ inches in external diameter and 7 feet long. The total tube surface is 6,668 square feet, and the total heating surface 8,416 square feet. The grate area is 270 square feet. The boilers are worked under induced draught. Fans of 7 feet diameter are placed at the base of the chimneys, and these, run at 350 revolutions, give a pressure equal to 1 inch on water gauge. The funnels are 5 feet 3 inches in diameter, and are 50 feet high from grate level. With an air pressure of 1 inch, and steam of 120 pounds, the power developed at forty-three revolutions was 4,300 indicated horse power.

Another Officer Who Had Charge of Sault Canal Work.

Editor MARINE REVIEW: In looking over the resolutions of the Lake Carriers' Association in reference to Gen. Poe, together with press

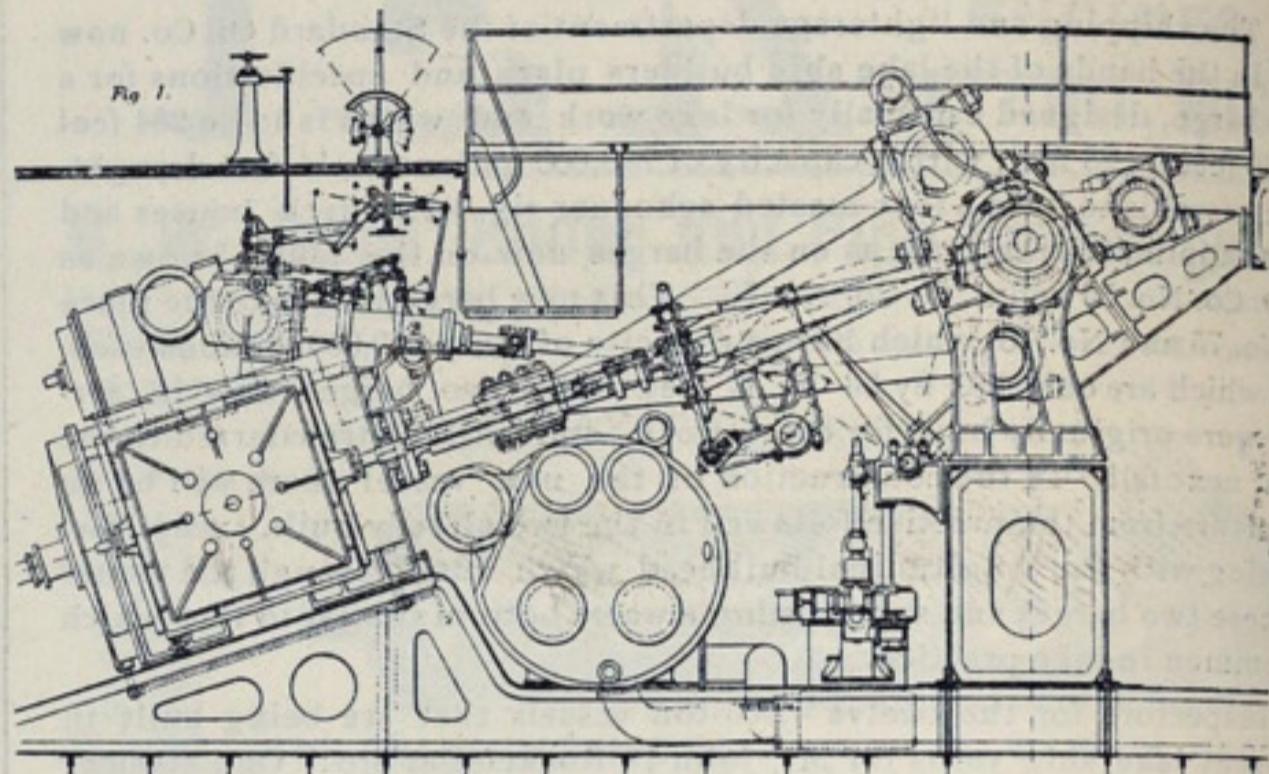
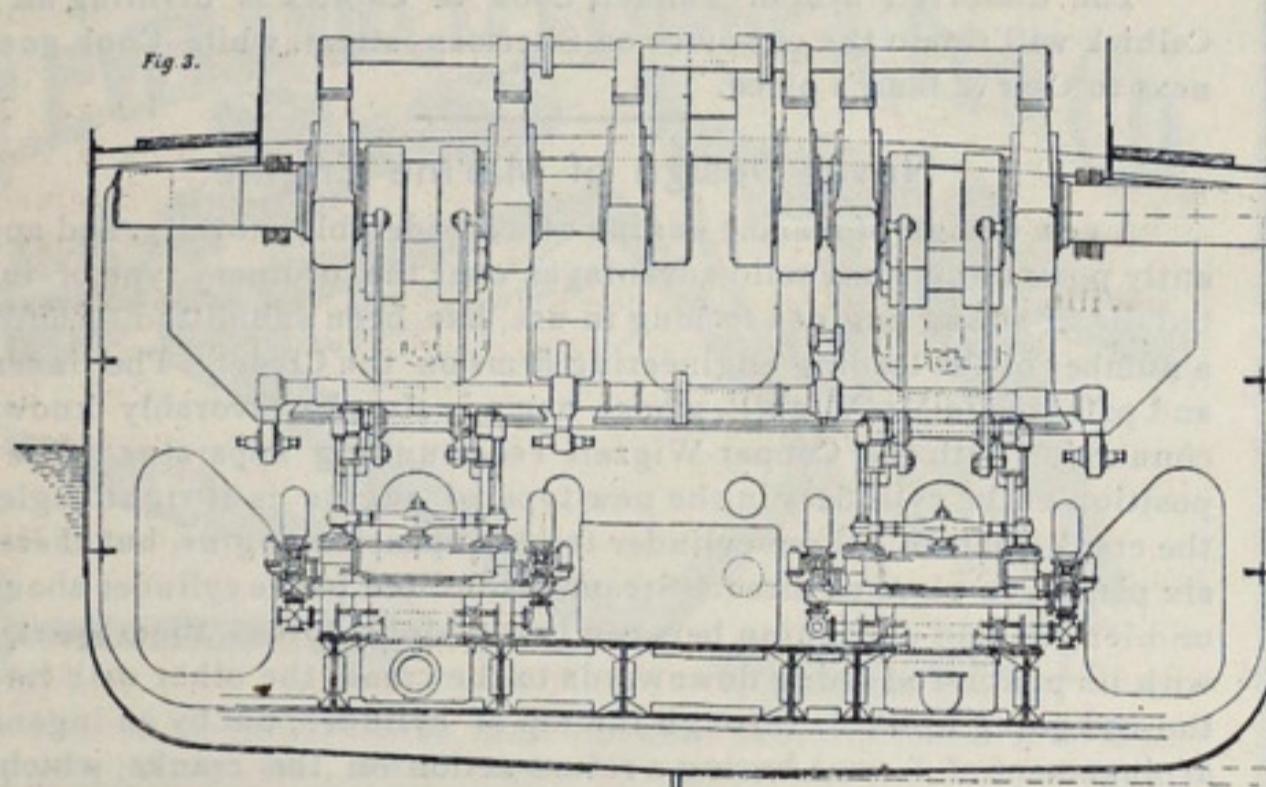
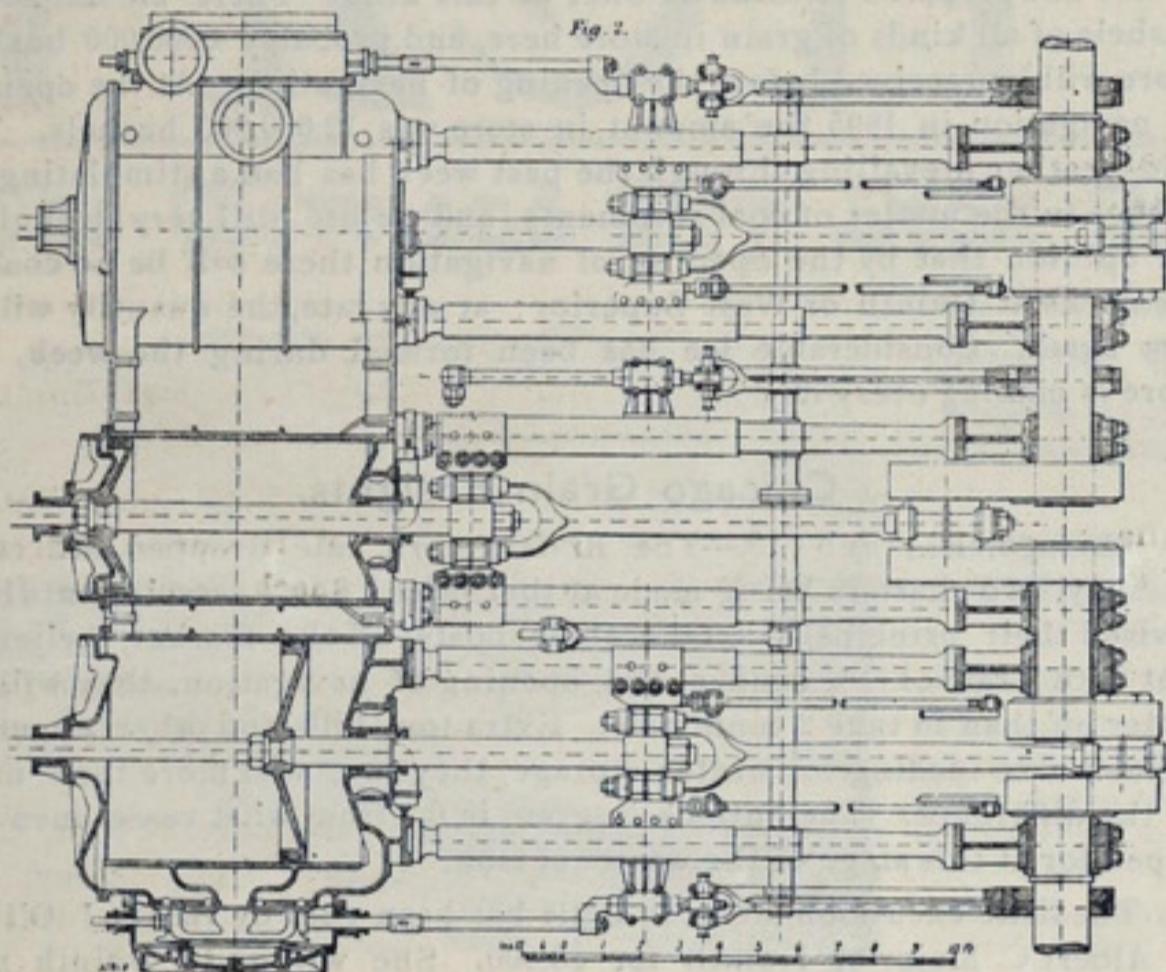
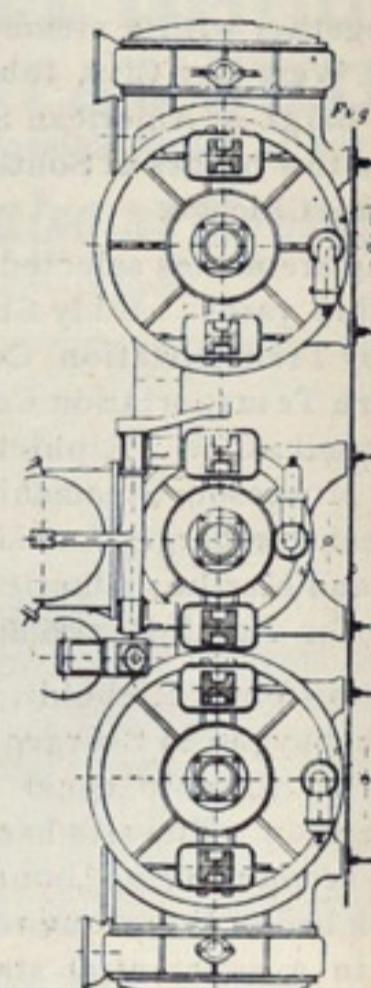
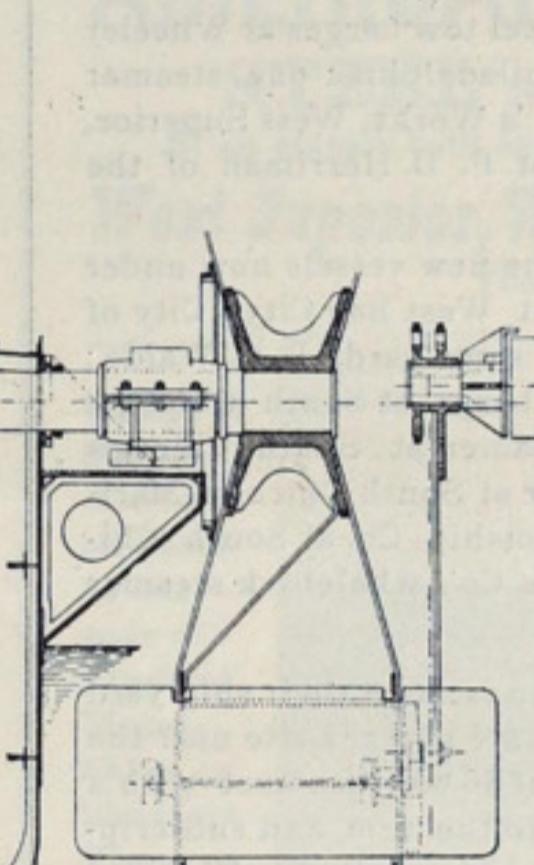


Fig. 1
Fig. 2
Fig. 3



THREE CYLINDER COMPOUND ENGINES FOR PADDLE STEAMER.

cylinders; and all three valves are worked by the ordinary link motion with adjustable gear. The space occupied athwartship by the machinery is 21 feet 6 inches. The moulded width of the vessel at this part is 30 feet, so that there is abundant room for the built-up framing of the engine. Forged steel has been used for all the working parts. The crankshaft is built up, all the cranks being shrunk and keyed on. The diameter of the shaft is $17\frac{1}{4}$ inches, and the length of the bearings on either side of each low pressure crank is 18 inches. The paddle shaft is $18\frac{1}{2}$ inches in diameter.

The paddle-wheels are of the usual feathering float type, the floats being of wood, 10 feet 6 inches long and 4 feet $4\frac{1}{4}$ inches broad. There are ten floats. The engine is run at forty-three revolutions. The outboard bearing is 2 feet $10\frac{1}{2}$ inches long, and is supported on the sponson, as shown on Fig. 3.

The surface condenser is placed athwartships under the main guides (Fig. 1), and the air pumps are vertical, and worked by levers from the piston-rod crossheads (Figs. 1 and 3). The feed and bilge pumps are also worked from the same levers. There are two centrifugal pumps, worked by independent engines fitted one on each side of the ship.

notices which have appeared from time to time since his death, it has occurred to me that possibly an injustice has been done another officer who was fully as able an engineer as the late Gen. Poe, viz., the late Gen. Godfrey Weitzell.

The first appropriation for the present lock at the Sault was made in 1870 and the lock was completed in 1881. From 1873 to 1883 Gen. Weitzell was in charge of the work. In 1883 Major F. U. Farquhar was in charge, and from 1883 to 1895 Gen. Poe had charge. From this it will be seen that the work was constructed under the direction of Gen. Weitzell. Mr. Alfred Noble made the designs for the lock and had immediate charge of the work from beginning until finished.

Detroit, Mich., Feb. 18, 1896.

ENGINEER.

The REVIEW is indebted to Yachting of New York for the engraving of the \$200,000 steam yacht *Josephine*, which appeared in our issue of Feb. 13.

The passenger propeller *Wisconsin* is offered for sale in an advertisement elsewhere in this issue. Inquiries should be addressed to W. J. Spicer, general manager, D. G. H. & M. Ry., Detroit, Mich.

Samuel Plimsoll of Load-Line Fame.

Samuel Plimsoll, the Englishman of load-line fame, who has for a great number of years been looked upon as a friend of British seamen, is still actively interested in shipping legislation. He lately wrote a letter from his home in Folkestone, England, to the *Coast Seaman's Journal* of



SAMUEL PLIMSOLO.

San Francisco, the organ of union seamen in this country, in which he urges American sailors to again take up the load-line question and other measures similar to the English act providing for the inspection of provisions, water, etc., put aboard sea-going vessels. In the concluding paragraph of this letter he says: "And now, my dear friends, you will give me, I doubt not, permission to add a very few words which are not relevant to this subject. Seek to know and strive to do the will of God, accept the mercy and the love He offers to all of you through Christ, and then I may hope to meet you all in Heaven at last."

Appointments of Masters and Engineers.

Union Steamboat Co., Buffalo: Steamers—Chemung, Capt. Walter Robinson, Engineer H. C. Jordan; Owego, Capt. John Byrne, Engineer Chas. W. Wall; Tioga, Capt. W. P. Garden, Engineer Geo. Fritsche; H. J. Jewett, Capt. F. B. Huyck, Engineer Jos. Howlett; Rochester, Capt. Jno. M. Clossey, Engineer N. Johnson; New York, Capt. Jno. Dugan, Engineer R. Hill.

Cleveland & Buffalo Transit Co., Cleveland: Steamers—City of Buffalo, Capt. John Edwards, Engineer J. V. Rendall; State of Ohio, Capt. W. H. Smith, Engineer Anthony Melroy; State of New York, Capt. H. McAlpin, Engineer William Steen.

Hutchinson, John T., Cleveland: Steamers—Germanic, Capt. M. H. Place, Engineer Thorn; Rube Richards, Capt. L. G. Vosburgh, Engineer H. Brakeman; Queen of the West, Capt. Chas. J. DeBeau, Engineer —. Schooners—E. C. Hutchinson, Capt. T. K. Woodward; May Richards, Capt. John Martin.

Detroit & Cleveland Steam Navigation Co., Detroit: Steamers—City of Cleveland, Capt. Dougal A. McLachlan, Engineer J. M. Sergeant; City of Detroit, Capt. A. J. McKay, Engineer Wm. S. Huff; City of Alpena, Capt. Mathew Lightbody, Engineer Armour Phillips; City of Mackinac, Capt. H. J. Slyfield, Engineer Wm. McDonald; City of the Straits, Capt. Duncan McLachlan, Engineer James Middleton.

McBrier, James, Erie, Pa.: Steamers—Fedora, Capt. F. A. Fick, Engineer John Stephens; Nyanza, Capt. Donald McDonald, Engineer J. R. Blanchett; Uganda, Capt. C. H. Wilson, Engineer Wm. Mead.

Cleveland-Cliffs Iron Co., Cleveland: Steamers—Pontiac, Capt. James B. Lowe, Engineer Thos. B. Kelley; Frontenac, Capt. Samuel N. Murphy, Engineer E. V. Barrey; Cadillac, Capt. J. C. Symes, Engineer T. J. Reese; Pioneer, Capt. —, Engineer Alex Brown; Kaliyuga, Capt. John Lowe, Engineer Thos. Blaine. Schooner—Fontana, Capt. Henry Harris.

Mather, W. G., Cleveland: Steamer—Edw. S. Pease, Capt. Thos. Sloan, Engineer —. Schooner—Planet, Capt. Frank Passon.

North Western Transportation Co., Detroit: Steamers—H. H. Brown, Capt. E. C. Gatfield, Engineer John H. Hand; S. R. Kirby, Capt.

D. Gerardin, Engineer Wm. Watts; E. M. Peck, Capt. C. H. Chamberlain, Engineer Emil Mercier; Fayette Brown, Capt. J. W. Nicholson, Engineer Nic. Anderson. Schooner—G. E. Hartnell, Capt. John Jones.

Vulcan Transportation Co., Detroit: Steamers—Forest City, Capt. Joseph Sanders, Engineer John Erwing; R. J. Hackett, Capt. Henry Sanders, Engineer Daniel Harkins. Schooners—Wm. McGregor, Capt. John Hochrath; H. H. Brown, Capt. Thos. H. Sanders.

Corrigan, John, Cleveland: Steamer—Aurora, Capt. Robert Donaldson, Engineer James Cummings. Schooner—Aurania, Capt. Thomas J. Robinson.

Rhodes, R. R., Cleveland: Steamers—Yale, Capt. John Coulter, Engineer Harry Stone; R. R. Rhodes, Capt. P. Dowdell, Engineer Thos. Mooney; Neshoto, Capt. W. H. Humphrey, Engineer Thos. Malloy; Siberia, Capt. W. W. Morse, Engineer —.

Roby Transportation Co., Detroit: Steamer—L. C. Waldo, Capt. John Duddleson, Engineer Jeremiah Collins.

Whitney Transportation Co., Detroit: Steamers—Merida, Capt. John Ivers, Engineer James Balfour; Tampa, Capt. John Leonard, Engineer Chas. Murett; Mecosta, Capt. C. G. Ennes, Engineer Owens Williams; Lansing, Capt. A. C. May, Engineer Joseph Ceyean; D. C. Whitney, Capt. D. Critchet, Engineer Joseph Lacy; Nipigon, Capt. Edward July, Engineer Chas. Francomb. Schooners—Ashland, Capt. Geo. Dennis; Melbourne, Capt. Geo. Cooper.

Smith, Edward, Buffalo: Steamers—Thomas Cranager, Capt. J. S. McNeil, Engineer M. La France; City of Paris, Capt. E. D. Ballantine, Engineer M. C. McDougall; City of Venice, Capt. F. P. Houghton, Engineer J. A. McDougall; Samuel Marshall, Capt. August Jean, Engineer A. Leitch; Samoa, Capt. W. W. Stewart, Engineer Louis Minnie.

Alger, Smith & Co., Detroit: Steamers—Volunteer, Capt. Wm. H. Rolls, Engineer P. B. McCabe; Gettysburg, Capt. S. H. Currie, Engineer W. P. Wenner; Torrent, (tug), Capt. Alex Cattanach, Engineer J. M. Cronenweth.

West Division Steamship Co., Milwaukee: Steamers—Fred Pabst, Capt. D. C. Sullivan, Engineer James Bennett; W. H. Wolf, Capt. F. L. Graves, Engineer Thos. Albrighton.

Elphick, C. W., & Co., Chicago: Steamers—George N. Orr, Capt. C. Z. Montague, Engineer Smith; Arthur Orr, Capt. Jno. Massey, Engineer —; Josephine, Capt. Jno. Isbestor, Engineer Wm. Durgin. Schooners—Thos. L. Parker, Capt. Wm. Smith; F. W. Gifford, Capt. E. G. Kohnert; C. P. Minch, Capt. W. M. Kaufman.

Port Huron & Detroit Rapid Transit Line, St. Clair, Mich.: Steamer—Unique, Capt. John Robertson, Engineer James G. Purvis.

Eddy-Shaw Co., Bay City, Mich.: Steamers—City of Bangor, Capt. Wm. Cavers, Engineer Geo. M. Tilton; E. C. Pope, Capt. John H. Smith, Engineer Henry Annet; Selwyn Eddy, Capt. J. H. Coleman, Engineer S. G. Cowell; Penobscot, Capt. Edward Smades, Engineer Evans Jenkins.

Williams, H. W., Transportation Co., South Haven, Mich.: Steamers—City of Kalamazoo, Capt. David Morris, Engineer John Larell; H. W. Williams, Capt. John Bayne, Engineer R. Peterson; Glenn, Capt. Frank Swails, Engineer C. La Bounty; Loraine, L., Capt. Chas. Ingraham, Engineer Thos. Jenkins.

Grummond's and Mackinac Line, Detroit: Steamer—State of Michigan, Capt. F. R. Dale, Engineer Walter Harling.

Whitaker, B. & Sons, Detroit: Steamer—Byron Whitaker, Capt. Augustus Ames, Engineer D. W. Blovett. Schooner—S. V. R. Watson, Capt. Charles Woods.

Hadley & Burdick, Toledo, O.: Steamer—Panther, Capt. T. D. Gibson, Engineer L. H. Sebastian. Schooner—Massasoit, Capt. A. J. Stalker.

Mathews' Line, Toronto, Ont.: Steamers—Niagara, Capt. James Morgan, Engineer James Tetro; Clinton, Capt. W. R. Maitland, Engineer Thos. J. Rolfe. Schooners—Emerald, Capt. John Joyce; Clara Youell, Capt. W. J. Colwill; Grimsby, Capt. G. W. Maitland; Lisgar, Capt. Henry Brooks.

Adams, Thomas, Detroit: Steamers—Tom Adams, Capt. D. Nicholson, Engineer Jas. Kelly; Jesse H. Farewell, Capt. D. J. Duncanson, Engineer John Johnston; F. E. Spinner, Capt. Jas. Laframboise, Engineer A. R. Crook. Schooner—J. H. Rutter, Capt. John Eberline.

Milwaukee Steamship Co., Milwaukee: Steamers—F. L. Vance, Capt. E. B. Marquette, Engineer Chas. Wilcox; R. P. Flower, Capt. F. W. Van Patten, Engineer Daniel Darcy.

Loutit, W. H., Grand Haven, Mich.: Steamer—Pentland, Capt. Thos. McCambridge, Engineer C. Ball.

Fitzgerald, R. P. & Co., Milwaukee: Steamers—Philip D. Armour, Capt. F. W. Chamberlin, Engineer J. R. Mason; Wiley M. Egan, Capt. Fred Howe, Engineer Fred Coleman; R. P. Fitzgerald, Capt. Leslie E. Boyce, Engineer B. McNeil; John Plankinton, Capt. Louis H. Powell, Engineer Wm. Fell; Denver, Capt. Peter Christenson, Engineer John

Smith; Omaha, Capt. Hawley M. Boyce, Engineer Alex Staley; Pueblo, Capt. Duncan Stalker, Engineer Ed. O'Neil; Topeka, Capt. Albert Gibbs, Engineer H. Myers.

Wisconsin Steamship Co., Milwaukee: Steamer—Ferd. Schlesinger, Capt. Daniel P. Craine, Engineer Arthur R. Fortier; Geo. H. Dyer, Capt. Wm. Jamieson, Engineer Geo. Robinson.

Hope Transportation Co., John A. Francombe, manager, Detroit: Steamer—W. R. Stafford, Capt. William Roach, Engineer John A. Francombe. Schooner—Ed. McWilliams, Capt. Nelson Blair; John A. Francombe, Capt. Andrew Christensen.

Curtis & Brainard, Toledo, O.: Steamers—Chesapeake, Capt. John Hogan, Engineer D. N. Foster; Mohegan, Capt. Wm. Hogan, Engineer Jas. Hogan. Schooners—Mingoe, Capt. A. Snelgrove; Chippewa, Capt. Jno. Davidson.

Morley & Hill, Marine City, Mich.: Steamers—W. B. Morley, Capt. J. A. Nicolson, Engineer P. Caniff; St. Lawrence, Capt. Ralph Byrns, Engineer Tib. Durrant; J. J. Hill, Capt. John Andrews, Engineer Lockhart.

Boyce, Sherman H., Milwaukee: Steamers—Mary H. Boyce, Capt. W. F. McGregor, Engineer Clark Deremo; Mary A. McGregor, Capt. A. E. McGregor, Engineer A. Smith.

North West Transportation Co., Limited, Sarnia, Ont.: Steamers—Monarch, Capt. E. Robertson, Engineer E. W. McKean; United Empire, Capt. Jno. McNab, Engineer S. Brisbane.

Brown, Geo. W., New York: Steam—James C. Lockwood, Capt. J. D. Peterson, of Huron, O., Engineer Lawrence D. Weeks.

Stewart Transportation Co., A. E. Stewart, manager, Detroit: Steam—C. F. Bielman, Capt. A. E. Stewart; Engineer Robert Lacy.

Corning & Edgar, Saginaw, Mich.: Steamers—C. H. Green, Capt. Charles E. Little, Engineer John Lee; Oscoda, Capt. Geo. W. Ryan, Engineer Robert Spear. Schooners—Our Son, Capt. W. A. Edgar; Genoa, Capt. D. C. Ryan; C. G. King, Capt. Peter Edgar; A. C. Keating, Capt. P. Ryan; Ida Corning, Capt. P. H. Edgar.

Owen, J. Emory, Transportation Co., Detroit: Steamers—John Owen, Capt. E. F. Thorp; J. Emory Owen, Capt. J. P. Young. Schooner—Michigan, Capt. F. J. Cadotte.

Livingstone, W. A., Detroit: Steamers—Thos. W. Palmer, Capt. Geo. F. Stilphen, Engineer Robert B. Hodge; Livingstone, Capt. W. H. Wilson, Engineer Alex. Morison.

"Rules for Foretelling the Weather.

L. Black & Co. of Detroit, dealers in compasses, barometers, marine glasses, etc., have printed the following rules for foretelling the weather in their business card, a copy of which may be had upon application:

Rising Barometer—A rapid rise indicates unsettled weather. A gradual rise indicates settled weather. A rise with dry air and cold increasing in summer, indicate wind from northward; and if rain has fallen, better weather may be expected. A rise with moist air and low temperature indicates wind and rain from northward. A rise with southerly wind indicates fine weather.

Steady Barometer—With dry air and seasonable temperature indicates a continuance of very fine weather.

Falling Barometer—A rapid fall indicates stormy weather. A rapid fall with westerly wind, indicates stormy weather from northward. A fall with a northerly wind indicates storm, with rain and hail in summer, and snow in winter. A fall with increased moisture in the air, and the heat increasing, indicates wind and rain from southward. A fall with dry air and cold increasing (in winter) indicates snow. A fall after very calm and warm weather indicates rain with squally weather. The Barometer rises for northerly wind (including from northwest by north to the eastward) for dry or less wet weather, for less wind, or for more than one of these changes, except on a few occasions, when rain, hail, or snow comes from the northward with strong wind. The barometer falls for southerly wind (including from southeast by the south to the westward) for wet weather, for stronger wind, or for more than one of these changes, except on a few occasions, when moderate wind with rain (or snow) comes from the northward.

United States District Judge Brown of New York gave only \$8,000 salvage to the steamer Spain for towing a disabled tank steamer, the Hesbaye, 1,100 miles into New York in March last. Both vessels were bound for New York. There were nine days of towage. The sum of \$300 for the master of the Spain and \$2,700 for the crew was deducted from the total award.

THE LATEST OF THE BOOKS OF SAILING DIRECTIONS FOR THE LAKES, ISSUED BY THE HYDROGRAPHIC OFFICE, AND COVERING LAKES ERIE AND ONTARIO, ST. CLAIR AND DETROIT RIVERS AND LAKE ST. CLAIR, MAY BE HAD FROM THE MARINE REVIEW AT \$1.

Around the Lakes.

Harrison B. Mixer, seventy-five years of age, died in Buffalo recently. He was interested in lake commerce when sailing vessels predominated.

Samuel Risley, formerly for many years chairman of the Canadian board of government boiler and steamboat inspectors, died at Toronto, a few days ago. He was seventy-four years of age.

Capt. Howard T. Shaw, as assistant to Mr. C. A. Eddy, managing owner of the Eddy-Shaw vessels, will have his time taken up in looking after vessels of the fleet and will in future remain ashore entirely.

The Ashtabula Tug Co., recently organized among Cleveland vessel owners and ore shippers by Capt. W. A. Collier, has concluded arrangements for the purchase of all six of the harbor tugs owned by Kunkle Bros. and Wm. Downs of Ashtabula.

The announcement of Capt. Martin Swain's retirement from command of the Swain Wrecking Co.'s steamer Favorite was a surprise in marine circles. He has certainly made an enviable reputation while in charge of the Swain Company's affairs at the Straits. Capt. P. L. Millen, who succeeds him, ranks among the best vessel masters on the lakes.

Another representative of a foreign government, Capt. L. Melan of Helsingfors, Finland, who has been in charge of a steamer owned and operated by the Russian government on the Gulf of Finland, is examining ice crushing car ferries on the lakes. He has recently made trips on the Ann Arbor ferries and on the big St. Ignace at the Straits of Mackinac.

Representatives of the different general agents of insurance companies that control the bulk of the hull insurance on the lakes will be engaged for about two weeks in Cleveland on the work of giving a value and class to the numerous vessels in the Inland Lloyd's Register. In addition to Captain Daniel McLeod of Cleveland, who is in charge of the register, there are present Capt. J. V. Tuttle of Milwaukee, representing the Mannheim company; Capt. Charles Davis, representing D. Vance & Co., Milwaukee; Capt. Cyrus Sinclair, representing C. A. MacDonald & Co., and Earle & Massey of Chicago; Capt. A. L. Fitch, representing C. W. Elphicke & Co. and Geo. L. McCurdy of Chicago; Capt. W. H. Rounds, representing the Aetna company, Chicago; Capt. J. J. Orr, representing P. H. Fleming & Co., Chicago; Capt. Geo. McLeod, representing Smith, Davis & Co., Buffalo, Capt. John Perew, representing Worthington & Sill, Buffalo, and Capt. Wm. Morris, representing J. J. Clark of Detroit.

In General.

Great Britain for the last ten years has spent not far from \$200,000,000 on naval construction.

The 30-knot torpedo boats, which England is building in great numbers, are costing \$245,000 to \$250,000 each.

It is said that Italy is preparing for the construction of thirty cruisers, all to be heavily armored and to have a speed of at least 23 knots.

Chief Constructor Hichbom of the United States navy says of the Holland submarine torpedo boat building at the Columbian Iron Works, Baltimore, Md., that she may mean to future fighting ships and methods of warfare what the much-doubted monitor proved to our present navy.

The United States senate has passed a resolution, presented by Mr. Brice, providing for the printing of 3,000 copies of proceedings of the convention of the International Deep Waterways Association held in Cleveland recently. One thousand copies of the books will be for use of members of the senate and 2,000 for members of the house.

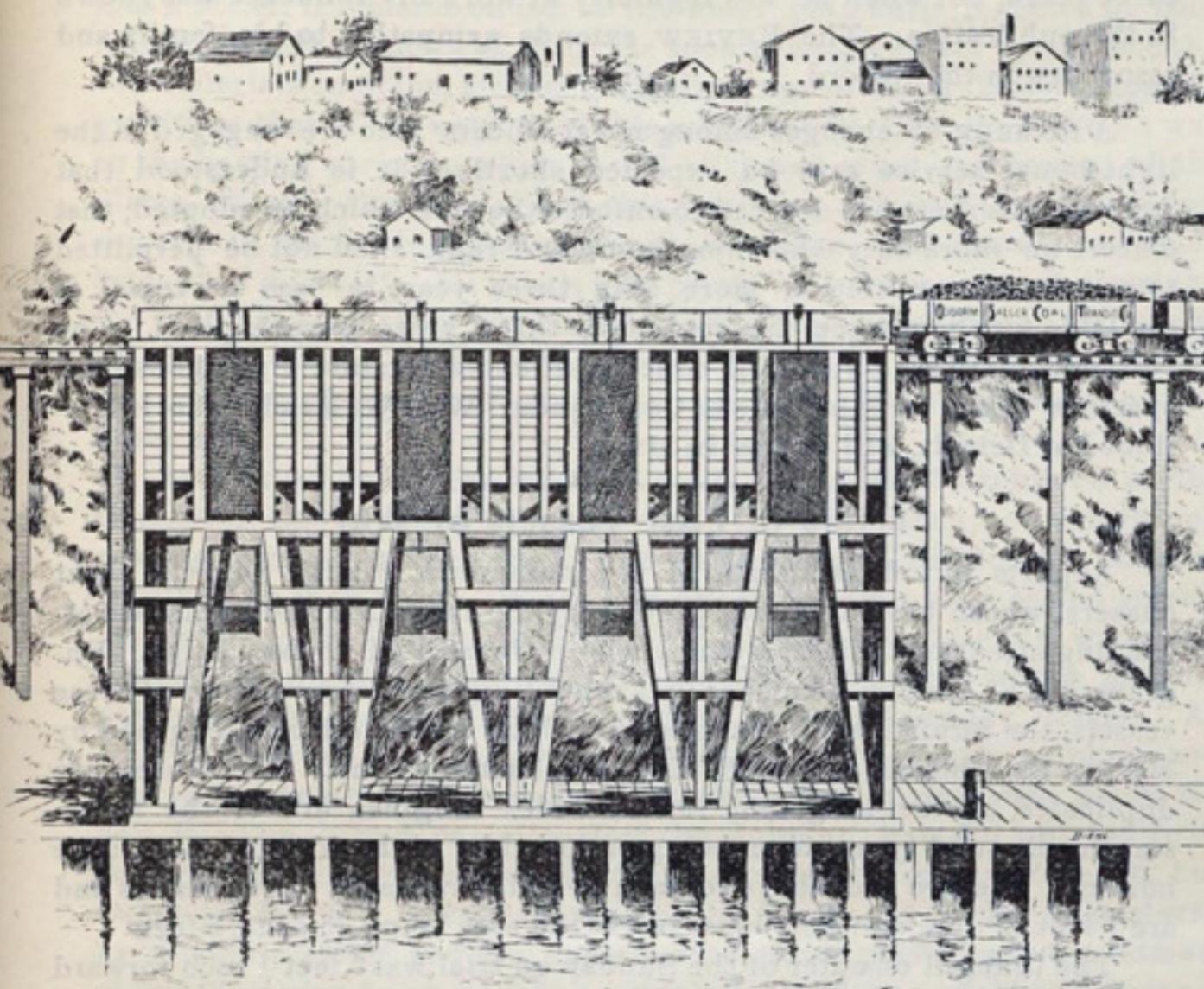
Appropriations for four, and probably for six, battleships will be recommended by the house committee on naval affairs. The construction of twenty or more torpedo boats will also be recommended, but as the disposition of the leaders in congress is decidedly against large appropriations of any kind, it is quite probable that the naval committee's hopes may not be fulfilled.

Fifty-six war ships, having an aggregate displacement of 261,960 tons, are now under construction in British yards—sixteen in government dockyards and forty in private yards. Seven are battleships of 104,300 tons displacement; six first-class protected cruisers, 72,800 tons; thirteen second-class protected cruisers, 73,400 tons; one third-class protected cruiser, 2,130 tons; two sloops, 2,100 tons; twenty-three torpedo boat destroyers, 6,900 tons; four torpedo boats, 330 tons.

An admiralty decision given by the United States circuit court of appeals at Boston recently is of general interest. The case was that of the schooner Helen Story, on which were three mortgages held by three separate parties. The first mortgage was recorded at Gloucester, where the schooner had merely a temporary enrolment; the two others were recorded at Boston, the place of the vessel's permanent enrolment. The district court ruled that the first mortgage had not precedence of the others on account of not having been recorded in Boston, but the court of appeals reversed this decree, with leave for a new trial, however, if desired.

New Fueling Dock, Cleveland.

Upon the opening of navigation in the spring a fueling dock with chutes, similar to the several docks on the Detroit and St. Clair rivers and at Detour, will be in operation in Cleveland. An engraving illustrating the new dock is printed herewith. It will be owned and operated by Osborne, Saeger & Co. and will be located on the Cuyahoga river, ad-



acent to the ship yard of the Cleveland Ship Building Co., and near the new Erie Coal Transfer Co.'s fast coal car unloading machine. Osborne, Saeger & Co., who are miners and shippers of Youghiogheny coal, recently purchased 300 coal cars, which will be used exclusively in moving their coal, and which will enable them to guarantee an ample supply of the Youghiogheny product, day and night, at the fuel dock. The dock will combine all new features of the pocket system. The chute capacity is 250 tons, and this will be increased by the building of additional smaller chutes for fueling harbor tugs.

More Evidence on the Detroit River Tunnel Question.

Although it is now certain that lake vessel owners have by long odds the best of the Detroit river bridge fight in Washington, the executive officers of the Lake Carriers' Association are leaving no stone unturned in their latest effort to show that a double-track tunnel is entirely feasible and that it can be constructed at a cost far below the estimates that have been placed upon a bridge by officials of the Michigan Central Railroad. Mr. Harvey D. Goulder has been to Chicago again during the past week, and he has sought out, and obtained statements from prominent engineers who were connected with the tunnel investigations of 1889-91. Letters from these engineers are conclusive and very interesting.

Mac Ritchie & Nichol, civil engineers and contractors of Chicago, say: "In 1879 we assisted the late Mr. E. S. Chesbrough, C. E., in making plans and estimates for a tunnel across the Detroit river by way of Stony island and Amherstburgh. Mr. MacRitchie accompanied the late Mr. I. C. Chesbrough, C. E., brother of E. S. Chesbrough, and examined the ground. Plans and borings had been previously made and were furnished to Mr. Chesbrough. Several plans were made and estimated upon. Mostly all the work in the tunnel proper was in rock. One method of construction proposed was by means of a moveable cofferdam. The depth would be much less than at Detroit. The proposition was for a double-track tunnel. There were at least three plans, no one of which would cost to exceed \$2,000,000. The lowest cost of any plan was less than \$1,500,000. The plan was considered entirely feasible, and we do not know why it was not carried out, unless it may have been on account of the distance from Detroit."

Samuel G. Artingstall, another well-known Chicago engineer, who was engaged in the tunnel investigations of 1889-91, says: "In 1891 in conjunction with Chas. MacDonald and others I made examination (as I had previously done) into conditions for tunneling under the Detroit river at Detroit. After a personal visit to Detroit and investigation and an examination of borings, etc., I made estimates on a plan of double-track tunnel, the character of which we considered far in advance of anything up to that date. I do not feel at liberty to give the figures, even if I had them by me. I do not know the reason why the project was abandoned. There were no engineering difficulties, which were regarded by

myself or my associates as unusually difficult. I had examined the question before, and in 1889 had written my statement to the Canada & Michigan Tunnel Co., which I understand was used before the government commission which was about that time examining into the question. In that paper I stated that tunneling was practicable and in my judgment the cheapest and best solution of the problem of crossing. My examination and investigation in 1891 confirmed this opinion."

A letter from George Chambers of Chicago has reference particularly to the character of material underlying the river. He says: "I had a contract with Mr. James F. Joy, representing the Michigan Central Railroad, to excavate and construct what was called a drainage tunnel under the Detroit river, between Detroit and Windsor. This, I understood, was a preliminary work to test the ground with the view of constructing a railroad tunnel, and also to afford drainage for the same, when constructed. We found, in sinking the shaft on the Detroit side of the river, that the material was a very compact, blue clay, very good material in which to construct such a railroad tunnel as was intended to be made at that time. This small tunnel we completed one-half of the distance across the Detroit river, or between its banks, meeting with little or no obstruction, excepting the bad gases. The material in which the drainage tunnel was made is what is known as hardpan, in which gases are found. No such trouble would be found in the clay in which the tunnel proper would be constructed. On the Canadian side of the river we found in sinking the shaft about the same kind of material that was found on the Detroit side, until we commenced drifting for the drainage tunnel. Here we encountered quicksand, making the progress slow, having to exhaust the flow of sand at frequent intervals before headway could be made. After the quicksand was exhausted the material left was a compact and solid clay which was suitable for the construction of the tunnel. From the actual working, which in all was nearly three-quarters of the entire distance under the river, I have no hesitancy in saying that the material at that place is first-class for a large tunnel to be built at moderate cost, involving no unusual difficulties. The appliances now are much improved for tunnel construction. We used none of the modern methods, such as compressed air, the pneumatic process and other recent improvements."

River Rules Applied to the Lakes.

Editor MARINE REVIEW: Please tell your Chicago correspondent, who furnished a communication in your issue of Feb. 6, page 6, that he falls into the usual error of applying the rules which have been found correct as regards rivers to our great lake system. In the former the watershed is 100 to 1,000 times the area of the stream, and any change tending to lessen the impounding of the rainfall by trees, marshes, etc. has an immediate effect, while the watershed and the lake areas are nearly equal, and the small percentage of clearing near their borders can have but little effect. If we should consider Lakes Huron and Michigan by themselves, and take from the cross section of the St. Clair the area of St. Mary's river, and for the moment suppose there was no inflow to the lakes from any source, it would take 109 days to lower them 1 foot, while if, for example, we should suppose the sources of supply of the Ohio river cut off in the same manner, it would run dry in a few hours. If instead of trying to get the government to plant trees, he could invent some way of making more snow, so that the quick thaw in the spring would add say 2 feet to the levels, then our June rise would amount to something; nor would even a dry summer make it close nipping for vessels in the fall, and two or three such years would make vessel men happy again.

D. FARRAND HENRY.

Detroit, Mich., Feb. 18, 1896.

An Immense Tug.

The Philadelphia & Reading Coal & Iron Co.'s seagoing tug Tamaqua, built recently, is probably the largest craft of her kind afloat. She is 171 by 29 by 18½ feet, and is fitted with triple expansion engines of 1,000 horse power. This tug will be used to tow coal barges, and it is expected she will handle four barges of 1,500 tons capacity each. She has a long deck house, which covers engine and boiler space and gives ample accommodations for the crew. Her bunkers will hold 280 tons of anthracite coal, of which she consumes 19 to 20 tons daily. She is electrically lighted, and heated by steam, and carries a large search light, together with fire and wrecking pumps. She has a steam windlass and capstan, steam steering gear and steam towing machine.

A freight steamer of 11,300 tons deadweight carrying capacity was recently launched by Wm. Doxford & Son of Sunderland, England. Her name is Algo and she is owned by Crow, Rudolph & Co. of Liverpool. She is 475 feet long, 58 feet wide and 34 feet 8 inches deep.

Mr. Leslie Van Orman, who has been in the employ of Randerson & Son for the past six seasons, has purchased L. L. Ordner's marine milk depot, and will continue the business at the old stand, Main street Bridge, Cleveland.



DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O.
SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each.
Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department on June 30, 1895, contained the names of 3,342 vessels, of 1,241,459.14 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1894, was 359 and their aggregate gross tonnage 634,467.84; the number of vessels of this class owned in all other parts of the country on the same date was 316 and their tonnage 642,642.50, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1895, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels.....	1,755	857,735.00
Sailing vessels.....	1,100	300,642.00
Unrigged.....	487	83,082.00
Total.....	3,342	1,241,459.00

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30, 1891.....	204	Net Tonnage.
" " " 1892.....	169	45,168.98
" " " 1893.....	175	99,271.24
" " " 1894.....	106	41,984.61
" " " 1895.....	93	36,353.00
Total.....	747	334,634.28

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.
(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1894.	1893.	1892.	1894.	1893.	1892.
No. vessel pass'ges	14,491	12,008	12,580	3,352	3,341	3,559
T'n'ge, net regis'td	13,110,366	9,849,754	10,647,203	8,039,106	7,659,068	7,712,028
Days of Navigat'n	234	219	223	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

AT A RECENT meeting of one of the engineering societies of Great Britain, Archibald Denny of the famous firm of Denny Bros., scientific ship builders of the Clyde, stated that when his firm desired to build paddle-steamers for the Belgian government they experimented in their tank with a vessel 300 feet long by 35 feet beam, and found the best speed was 19½ knots, but ultimately discovered that by merely adding 3 feet to the beam the speed was increased to 20½ knots, the draught being the same—8 feet 6 inches. This unexpectedly high speed induced the Belgian government to give them the order. Later, when a still higher speed was required, the Belgian government allowed them 340 feet in length, and were immensely surprised when the beam was made as before—38 feet. The only reply Messrs. Denny made was that the tank said so, that it was bound to be true, and that they were willing to guarantee results.

IN VIEW of the delay attending sales of iron ore, or any movement towards vessel contracts for next season, it might be expected that vessel owners would be getting anxious about this time, but they are presenting a very strong front and seem determined not to accept contracts based on a dollar rate from the head of Lake Superior. Although the ore dealers still refuse to announce prices, and are content to await a more favorable time for trying to make sales, it is quite certain that a large amount of vessel tonnage would be taken at this writing at \$1 from the head of the lakes and 90 cents from Marquette, for the season, if ships were offered at these figures. In fact, two leading shippers are known to have made numerous offers of 90 cents for Marquette tonnage, but none of the vessel owners seem to want the ore at these prices.

HON. T. E. BURTON, member of congress from Cleveland, is already showing his ability in the matter of piloting through the house, thus early, such measures of importance to the lakes as do not involve appropriations. He secured favorable action in the house a few days ago on the bill providing for the regulation of St. Mary's river traffic, which will involve the establishment of rules by the secretary of the treasury and enforcement of same by the revenue cutter service. Mr. Burton will certainly make a good record for legislation of this kind, and should receive from the vessel interests of Cleveland the support of which he is deserving for re-election to congress.

IRVING B. SMITH, proprietor of the Marine Record, Cleveland, died of heart failure in Chicago on Monday last. Mr. Smith has been in failing health for some time past, and was being treated in Chicago for lung trouble when his heart became affected. He was a young man possessed of a great deal of business ability and of a most tenacious disposition in business matters. His health did not permit him to assume active duties connected with the publication of his paper during the past two or three years, but when he was regularly at work his influence was shown in the publication. The REVIEW extends sympathy to his family and associates on the Record.

A NUMBER of changes among naval officers who are engaged in the light-house service may be expected shortly. It is understood that Secretary Herbert has decided to enforce the rule which he adopted, that officers on shore duty who enjoy command rank shall not be permitted to remain in one station more than three years in case no vessel is available for them when the customary three years have expired. The enforcement of this rule will first be directed against light-house inspectors. The term of duty of Commander Wm. W. Mead, who is stationed at Detroit, will expire in May.

Trials of Fast Vessels of War.

Reports of official trials of the numerous British torpedo boat chasers, which have attained speeds varying from 28 to 30 knots, are attracting attention from everybody who is interested in fast ships. Engineering of London furnishes data regarding trials of two more of these vessels, the Sunfish and the Opossum, which were built and engined by Messrs. Hawthorne, Leslie & Co., Hepburn-on-Tyne. The vessels are duplicates, 200 feet long and 19 feet wide. Engines are of the three-stage compound type, steam being supplied by eight Yarrow water tube boilers. The two propellers to each vessel have each three blades and are 7 feet in diameter and 9 feet pitch, the area being 13 square feet.

The draught of water of the Sunfish on trial was 5 feet 1 inch forward and 8 feet 1 inch aft, the displacement being 283 tons. The steam pressure was 188 pounds, the air pressure being 2.95 inches on the water gauge. Her speed on a three hours' run was 27.581 knots, and on six runs over a measured mile it was 23.08 knots.

The draught of water of the Opossum on trial was 5 feet forward and 8 feet 1½ inches aft, the displacement being 280 tons. The mean speed of six runs on the measured mile was 28.212 knots, and for three hours 27.131 knots. The boiler pressure was 192 pounds to the square inch, and the air pressure for forced draught 3.2 inches on the water gauge in the stokeholds. Following are the observed data for the two vessels:

	SUNFISH.		OPOSSUM.	
	Starboard.	Port.	Starboard.	Port.
Vacuum.....	25.3 in	24.1 in.	26.6 in.	26.5 in.
Revolutions.....	353.8	349.8	341.6	344.3
Mean pressure in cylinders	High ... Inter ... Low....	81.4 lb. 35.4 " " " 15.1 "	82.8 lb. 35.9 " " 15.4 "	81.9 lb. 33.9 " " 13.6 " 14.9 "
Indicated horse-power	High .. Inter ... Low....	702 702 676	707 704 683	683 60 585
Total indicated horse-power.....	2,080	2,094	1,918	1,977
		4,174		3,895

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on Feb. 15, 1896:

	Wheat, bushels.	Corn, bushels.
Chicago.....	20,578,000	3,529,000
Duluth.....	10,712,000	84,000
Milwaukee.....	418,000	2,000
Detroit.....	306,000	23,000
Toledo	735,000	524,000
Buffalo.....	2,346,000	107,000
Total.....	35,095,000	4,269,000

As compared with a week ago, the above figures show at the several points named an increase of 322,000 bushels of wheat and 101,000 bushels of corn.

On Feb. 15, there was afloat at Chicago 148,000 bushels of wheat, 2,512,000 bushels of corn and 669,000 bushels of oats; at Buffalo, 259,000 bushels of wheat, 223,000 bushels of oats and 250,000 bushels of barley; at Duluth, 512,000 bushels of wheat; and at Milwaukee 176,000 bushels of wheat and 120,000 bushels of oats.

Bulged Boiler Plates.

Anent the matter of bulged boiler plates, traceable to the use of oil in boilers for loosening scale, it is worth noting that several years ago Prof. V. B. Lewis, made a very suggestive set of experiments, designed to show how thoroughly non-conductive a coating may be produced by the mixture of oil and dirt, or incrustating material, such as is apt to, and does, go on within a boiler. It is well known that when oil is put into a boiler, it remains on top of the water only until it comes in contact with small particles of dirt. As soon as such contact takes place the two materials combine, mechanically, into one of about the same specific gravity as that of the water, and this mixture will ultimately find its way to the heating surfaces, where it will stick and cause overheating of the plates. A very thin deposit of this kind—so thin and inconspicuous, sometimes, as to completely escape detection—will do a remarkable amount of mischief. All this is now pretty well known, but it remained for Prof. Lewis to show just how thin such a coating of oil and dirt might be and yet retain its very objectionable property of preventing ready transmission of heat from one side of a furnace plate to the water on the other side.

As detailed before the British Institution of Naval Architects at the time, Prof. Lewis' experiments consisted in taking clean iron vessels and coating some of them on the inside with a layer of the deposit one-sixteenth of an inch thick. Water was put in the clean and coated vessels and raised to the boiling point over a coal fire, and while the water was boiling the fire was suddenly removed and substances whose melting points were known were pressed against the outside of the vessels. As a result he found that the clean iron vessel did not melt sulphur, and that consequently its temperature on the outer surface was below 289 deg. F. The coated vessel melted the sulphur, but did not ignite it, though it ignited gun cotton, so that its temperature was above 392, but below 482 deg. F. It was evident that the fire was by no means as severe as in boiler practice, and the experiments were repeated with an atmospheric blow-pipe flame, with the result that the clean vessel had a temperature under 239 deg. F., while the coated vessel was so hot on its outer surface that it melted zinc, thereby indicating more than 793 deg. F. These figures tell a story which every one who is using, or who may be contemplating the use of, oil in boilers, will do well to bear in mind. The oil will serve an excellent purpose, with judicious management and careful watching; without them quite the reverse may prove itself true.

—Cassier's Magazine.

Serve's Steel Ribbed Tubes.

Mr. C. W. Whitney of New York, who represents in this country the manufacturers of Serve's ribbed steel tubes and Purve's ribbed boiler furnace flues, is an engineer of extensive experience in marine matters, and on this account his letters, even when they contain direct pleas for business, are interesting. Following is a copy of a letter from Mr. Whitney, which was received a few days ago by Mr. C. E. Wheeler, manager of the Cleveland Steel Canal Boat Co., who are building a fleet of thirteen steel barges at Elizabethport, N. J., for service between Cleveland and New York. The enclosures to which Mr. Whitney refers contain data regarding these tubes which has been printed at different times in the REVIEW.

C. E. Wheeler, Esq., Manager Cleveland Steel Canal Boat Co.—Dear Sir: Permit me to call your attention to Serve's ribbed steel tubes in connection with the canal boats that are being built for your company by Mr. Nixon of Elizabethport, N. J. The first cost of these tubes is much greater than that of plain tubes, but the ultimate cost is enormously less, as I shall hope to convince you in this letter.

I inclose herewith a list of steamers using our tubes, among which you will notice nine steamers of the White Star Line, running between New York and Liverpool. The White Star Line of steamers is, I think, generally considered to be about as well managed as any line crossing the Atlantic, and I think, as you know, is one of the most popular and successful of all the trans-atlantic lines. To ascertain for themselves just what the advantage was in the Serve ribbed tube, they fitted the freight steamer Cufic with them in the early part of 1893, and ran her in competition with the Runic, a sister ship, for the whole of 1893, 1894 and for two voyages in 1895. The conditions were as nearly alike as it is possible for them to be, both vessels doing the same work and occupying the same time in making their passages. At the expiration of the period above named, a little over two years, it was found that the Cufic had burned 2,600 tons less coal than the Runic, and that the cost of this 2,600 tons of coal to the White Star Line was more than they paid us for

the tubes; so that in this case the tubes paid for themselves outright in a little over two years. As a result of this experiment the White Star Line gave us an order to fit eight additional steamers with the tubes, the names of which you will find on the inclosed list.

I am also sending you with this the result of some experiments made in the power plant of the American Line steamers on their wharf at the foot of Fulton street, North river, New York. Here are two boilers of the Scotch marine type, precisely alike in all respects, except that one is fitted with 3½-inch plain tubes with retarders and the other is fitted with 3½-inch Serve ribbed tubes with retarders, and the result is that the boiler with Serve ribbed tubes evaporates 21 per cent. more water, and as you will notice, with the use of less fuel. I could go on and fill up page after page of just such results as I have been naming to you in this letter, but if what I have said, and after reading the inclosures which I send you, you are not convinced that it is for your interest to make a trial of the tubes, I am afraid that it would be useless for me to say any more.

I hand you with this also the result of an exhaustive experiment made with these tubes in a vertical boiler at Elizabethport, N. J., in 1891, by which you will notice that the average quantity of water evaporated in the same boiler when it was fitted with Serve ribbed tubes was nearly 40 per cent. more than when the boiler was used with plain tubes; and an experiment made by a Mr. Blechynden at Barrow, England, in some boilers made for the purpose, by which you will notice that the heat transmitted by the Serve tube was 33½ per cent. more than that transmitted by the plain tube under precisely the same conditions. From our standpoint and with those demonstrated facts, we do not understand how any one having the money to advance to pay for Serve's ribbed tubes can hesitate to use them, and yet we appreciate the fact that we do not all of us "see through the same goggles."

I am also mailing you the issue of the MARINE REVIEW of your city of Jan. 23 last, with an article which may have escaped your notice at the time, entitled "Scotch versus Belleville Boilers," and which I shall feel very much obliged if you can find time to read. I can vouch for the facts stated in that article, inasmuch as I wrote it myself and have made no statement that I can not prove. You are, of course, aware that it is not only the saving of fuel that has to be considered in a freight steamer especially, which I understand these that you are building are to be, but the additional space for freight which can be carried if your boilers are fitted with Serve's ribbed tubes, by reason of the diminished quantity of coal it will be necessary to carry. This of itself in the course of a year will amount to a very considerable sum.

C. W. WHITNEY.
No. 64 Broadway, New York, N. Y., Feb. 15, 1896.

Trade Notes.

Sterling, Welsh & Co., leading Cleveland dealers in carpets, oil cloths, curtains and other furnishings for vessels, offer wholesale prices to owners who may be making extensive purchases for new vessels or for refitting vessels already in commission.

James J. Donovan, representing the Enos Sheet Holder Co. of Peabody, Mass., is making a tour of lake cities in the interest of his firm. The sheet holder manufactured by this company is a very useful machine, especially on yachts and small sailing vessels. It takes the place of wooden or iron bits, forms a combination bitt and winch, and can be used to great advantage as a windlass or sheet holder on yachts. Although not long in the market, it is now sold in all parts of the United States and Canada, and the manufacturers purpose shortly to introduce it in Great Britain.

Blowers manufactured by the Buffalo Forge Co., which has fitted a system of forced draft to several lake vessels, are received with great favor in almost every line of service to which they are applied. A letter of recent date from the Greencastle Foundry & Machine Co. says: "We purchased through the N. O. Nelson Mfg. Co., of St. Louis, Mo., one of your No. 8 blowers, and we are running it with an eight-horse engine made by James Lefel & Co., Springfield, O. The blower gives perfect satisfaction, running light and giving good pressure. We poured an 8000-pound casting, melting 9000 pounds of iron in fifty-three minutes with sixty pounds of steam and without crowding the blower. Our cupola is 44 inches inside."

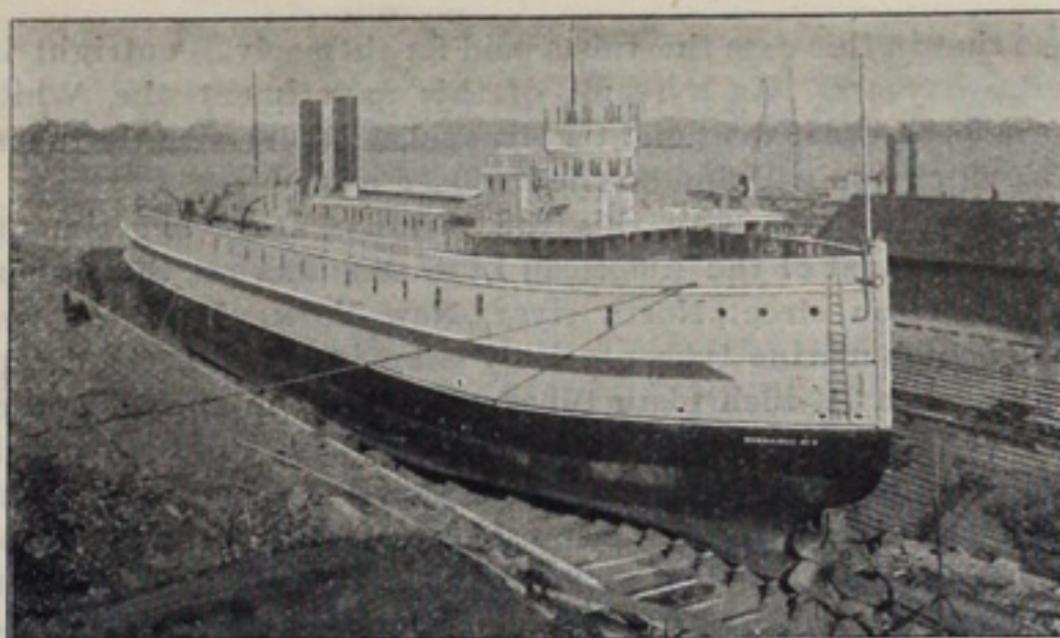
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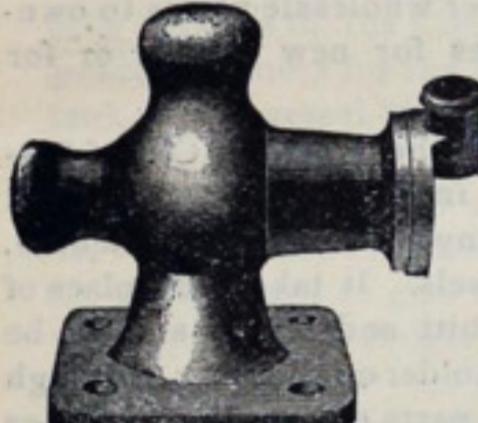


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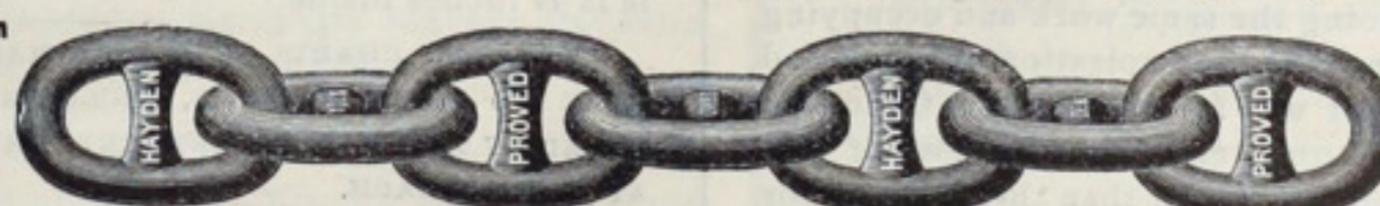
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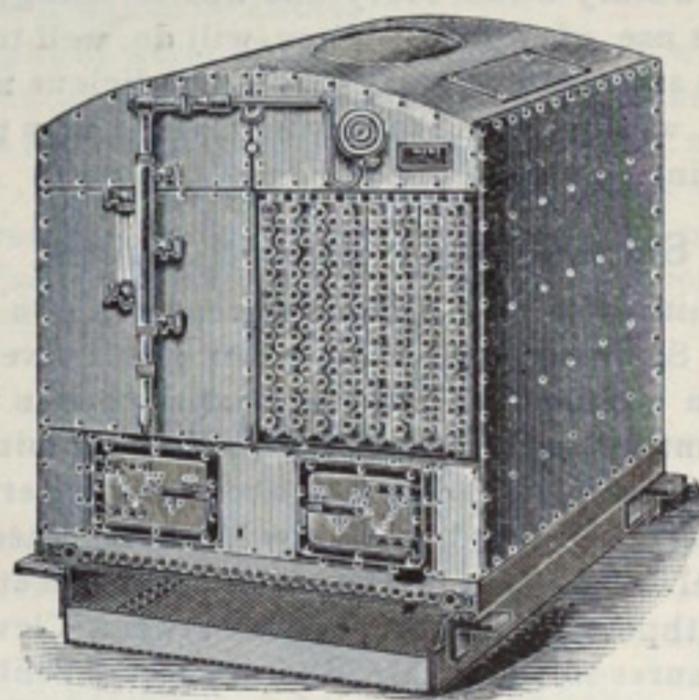
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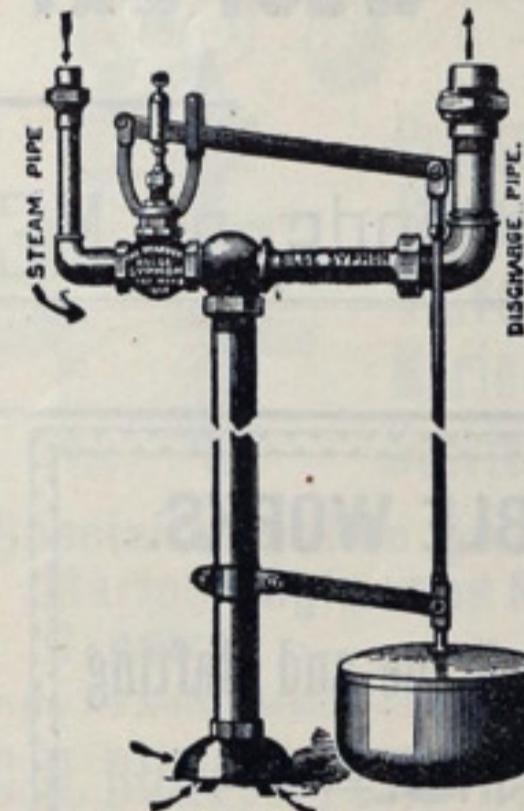
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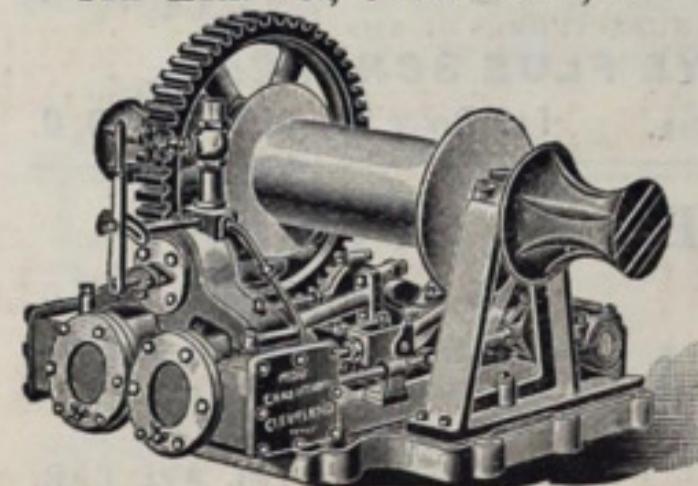
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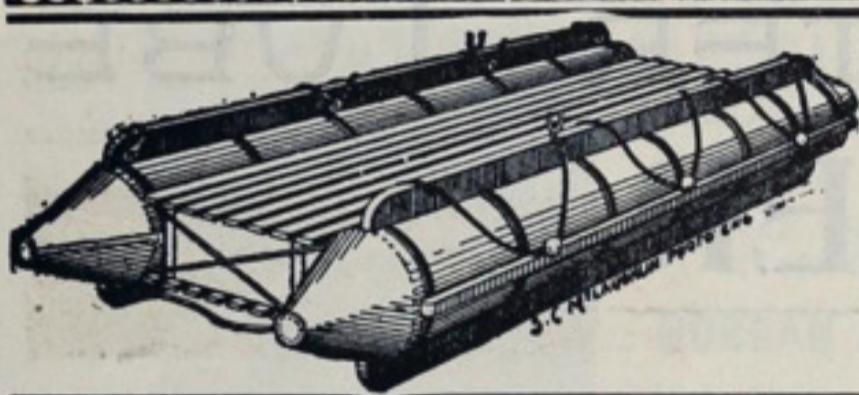
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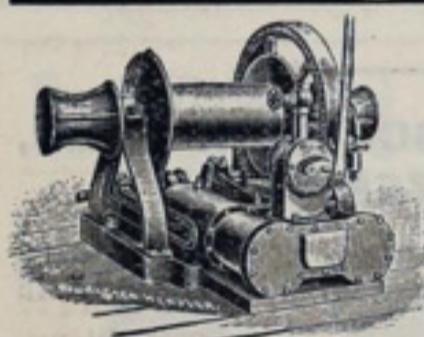
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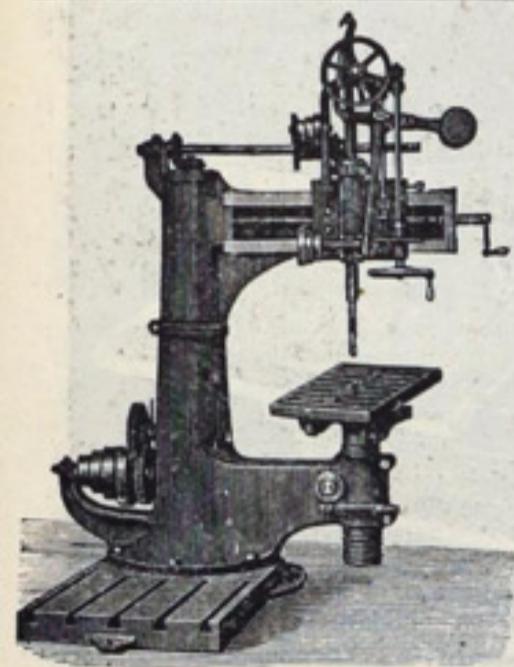
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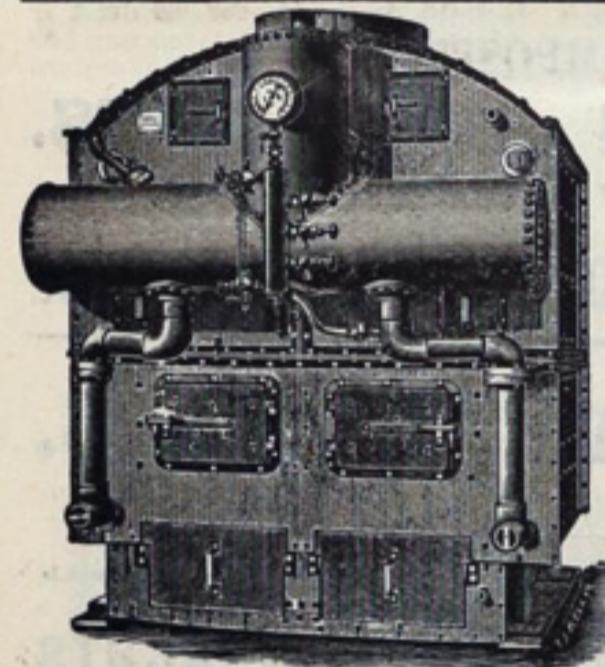
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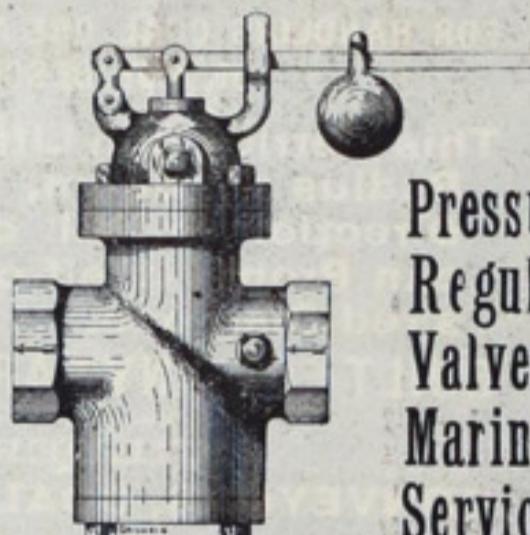
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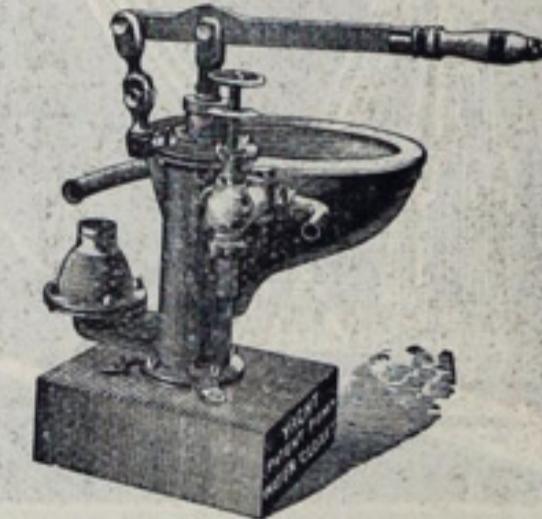
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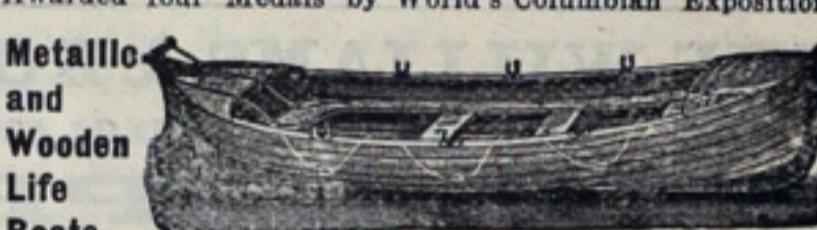
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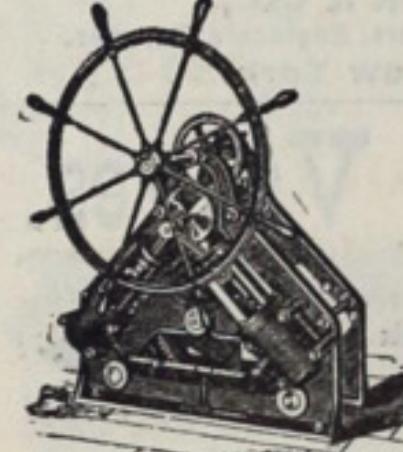
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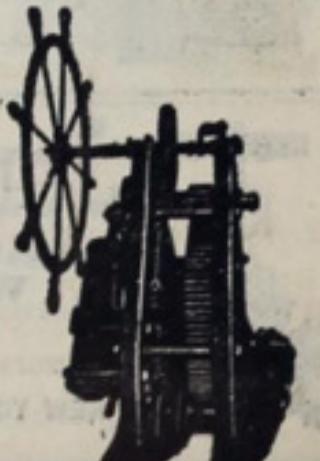
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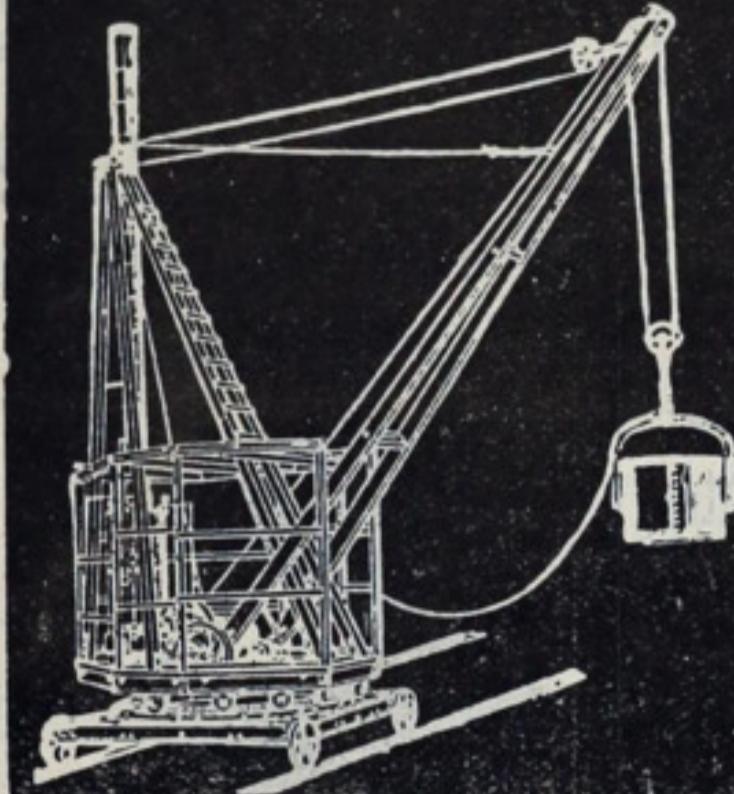
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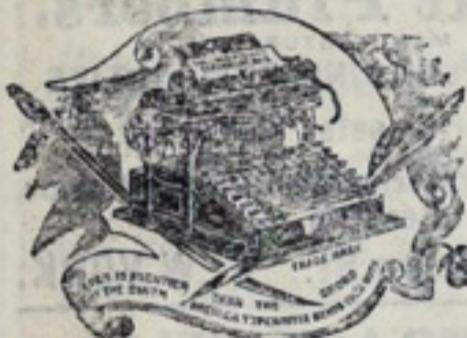
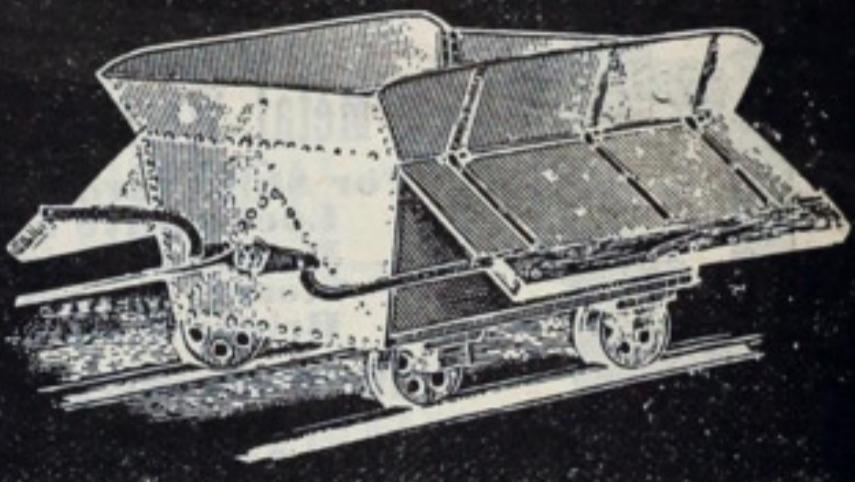
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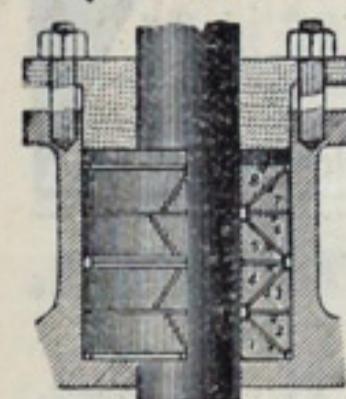
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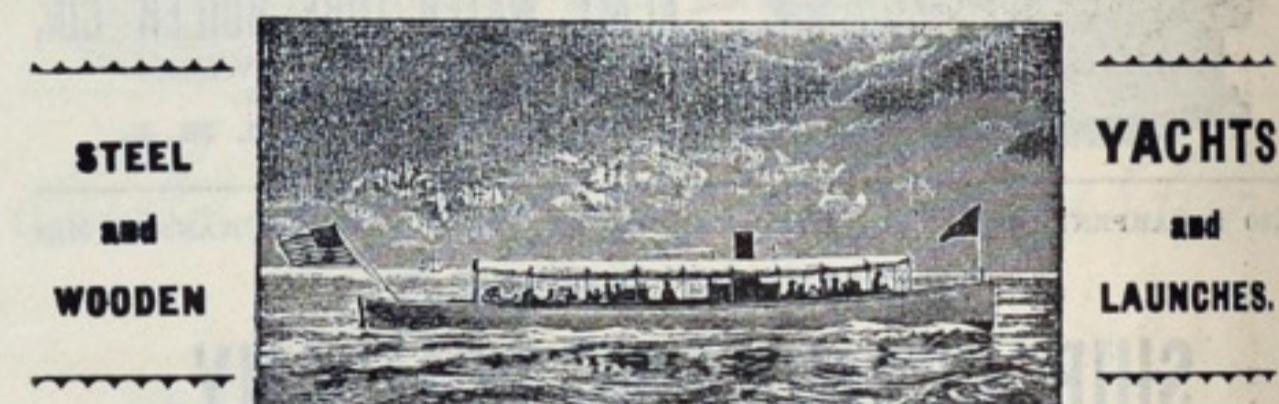
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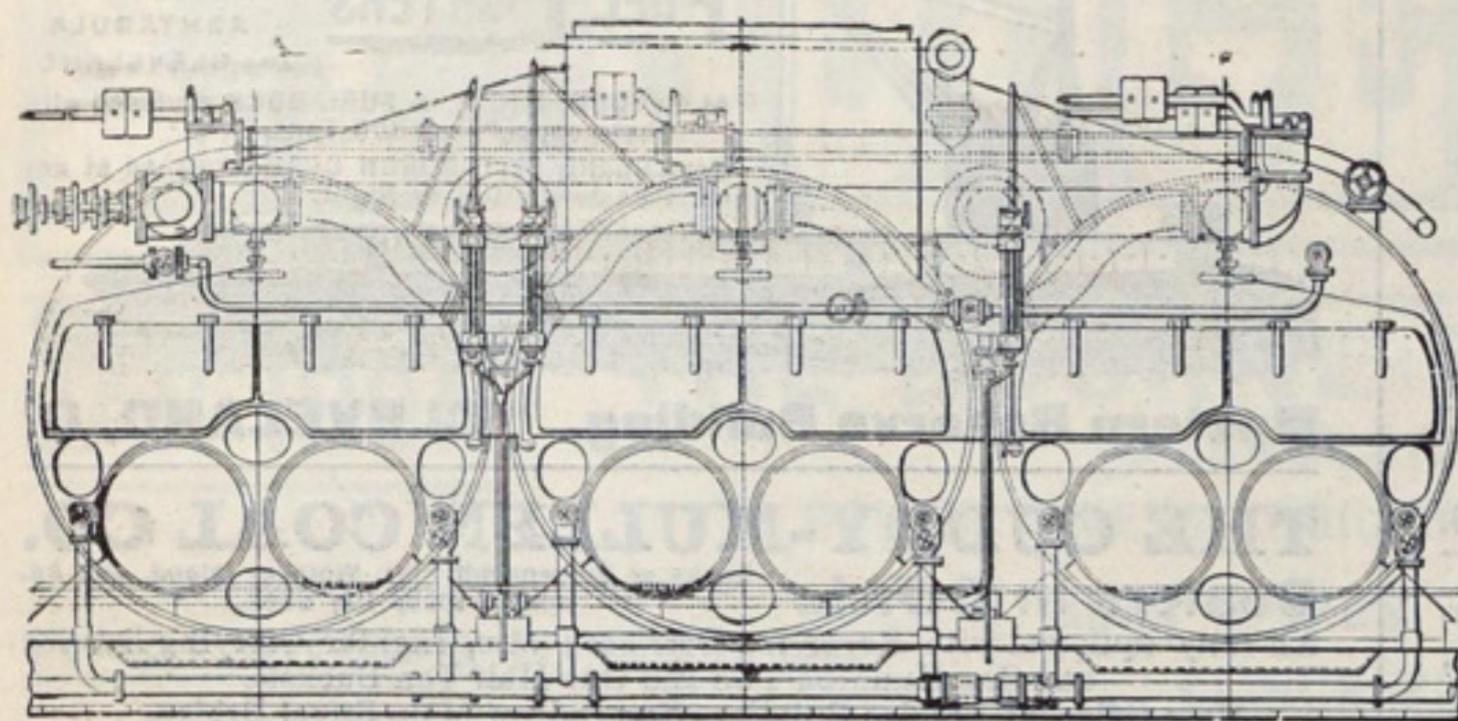
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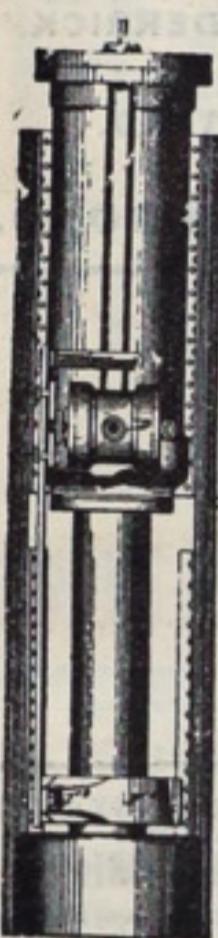
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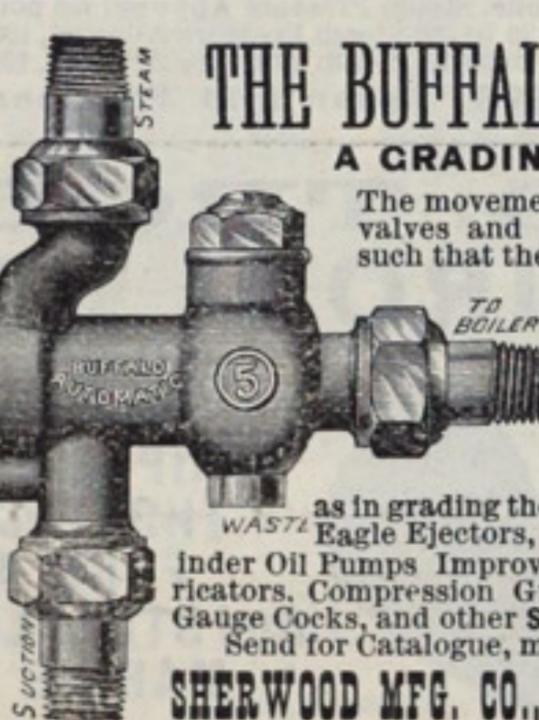
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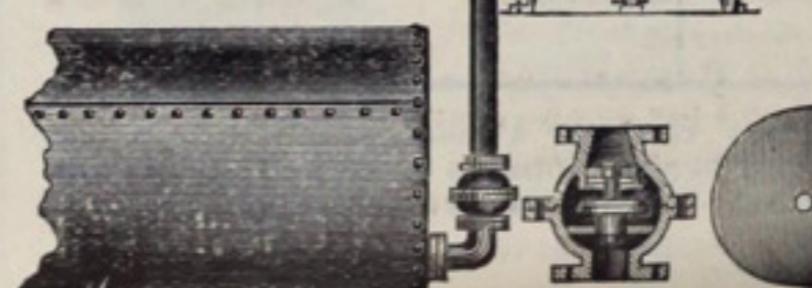
200 BOUCK AVENUE,

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REFERENCES.

- A.—Settling chamber.
- B.—Boiler.
- C.—Feed pipe to boiler.
- D.—Steam pipe.
- E.—Water supply pipe.
- F.—Check valve.
- G.—Spray disks.
- H.—Spray chamber.
- I.—Equalizing tube.
- J.—Blow-off pipe.
- K.—Automatic shut-off valve.
- L.—Division plate.
- M.—Deflector and separator.

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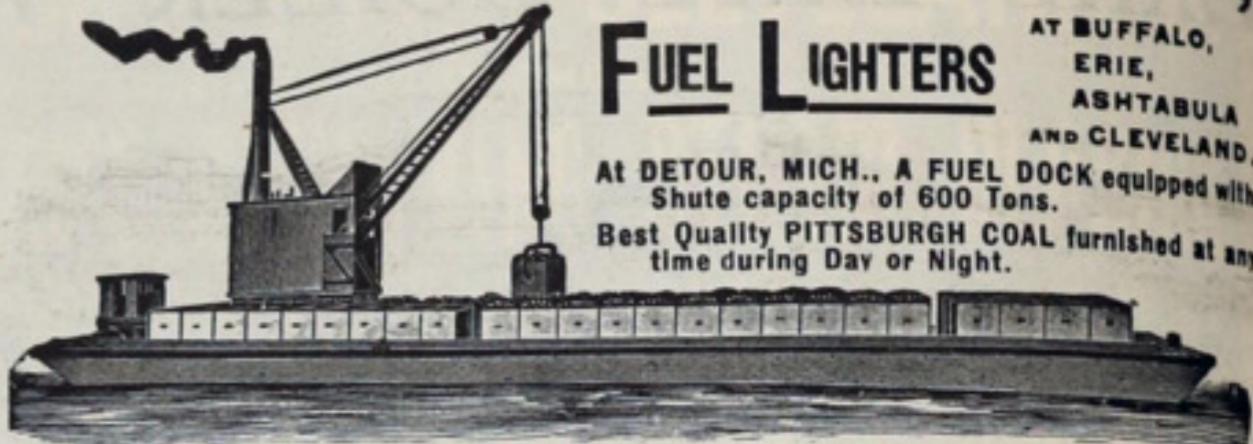
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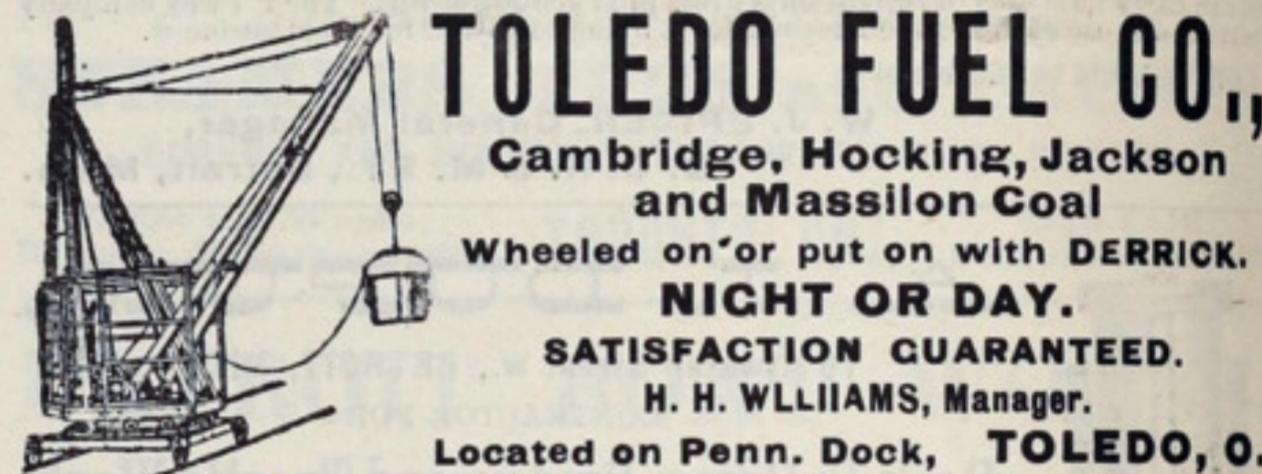
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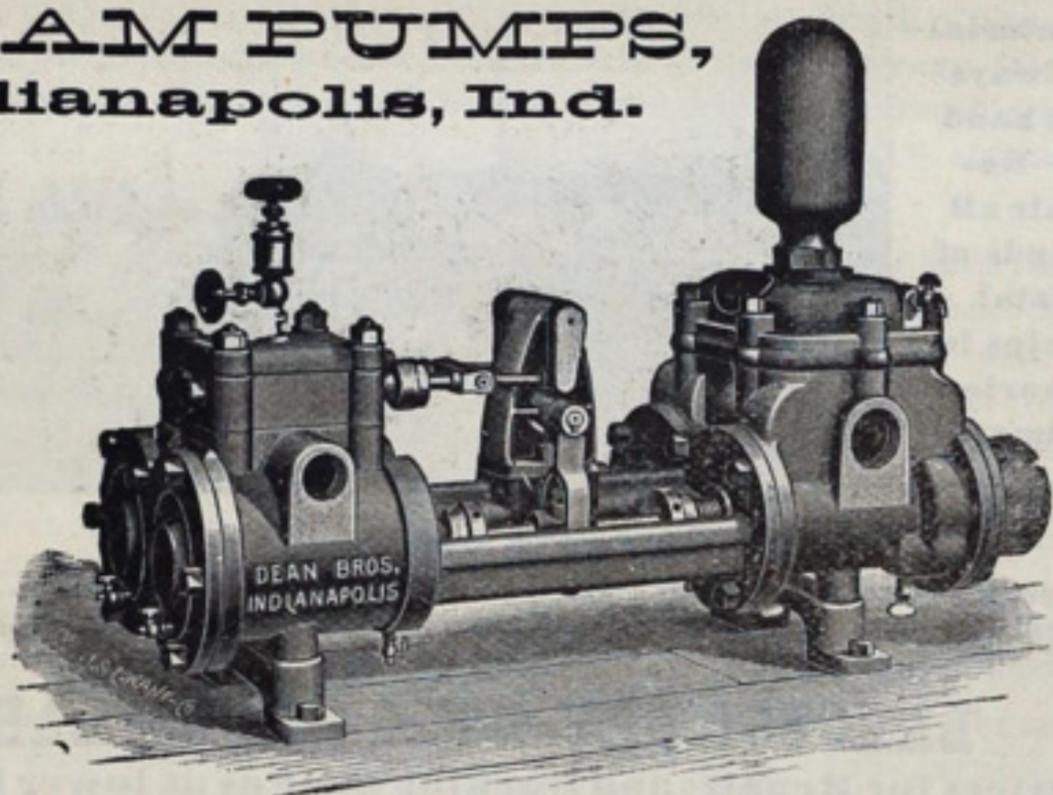
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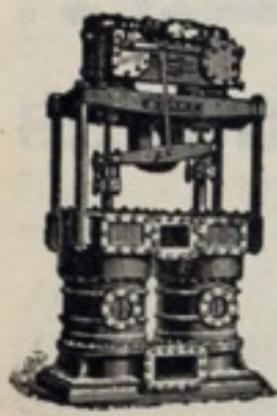
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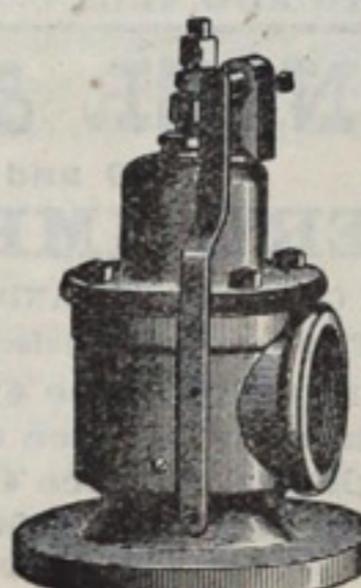
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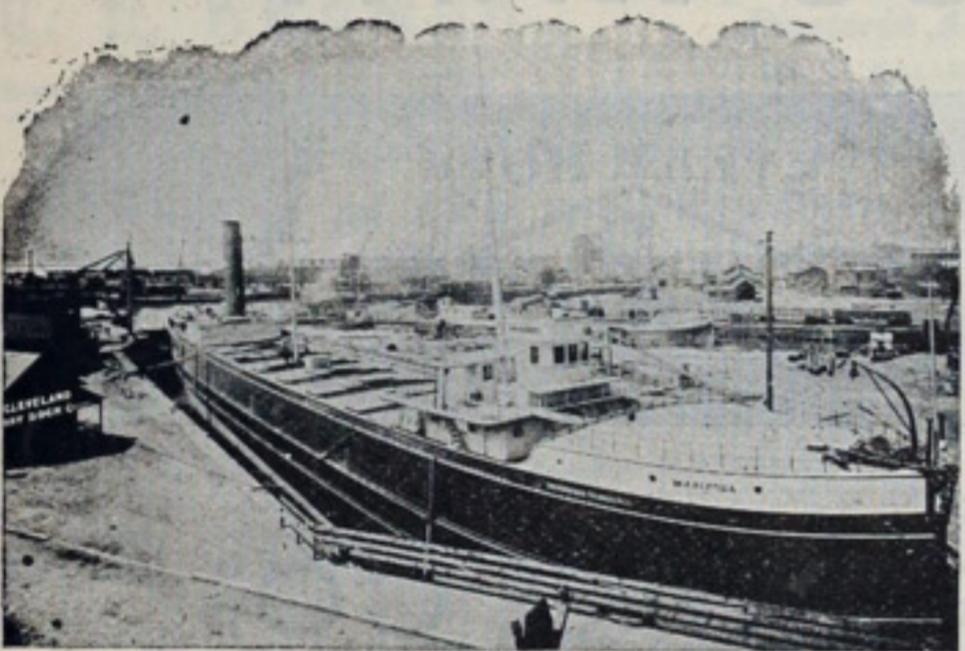
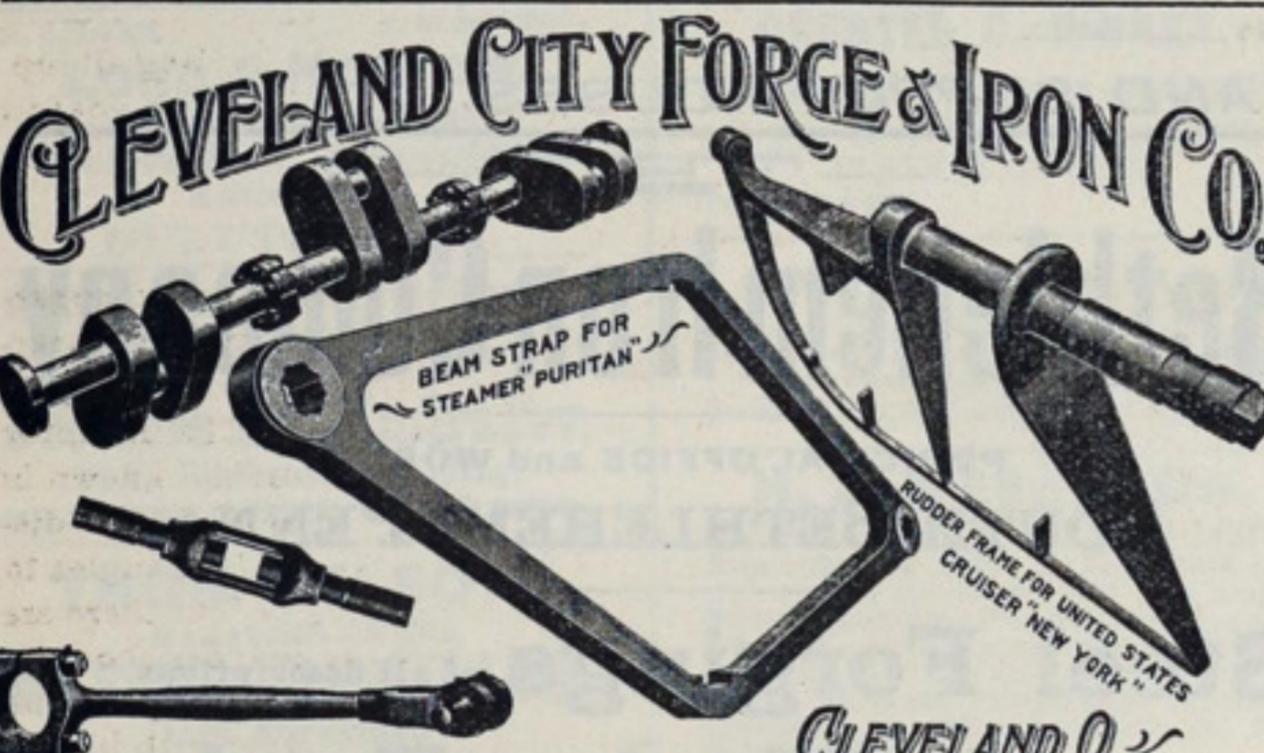
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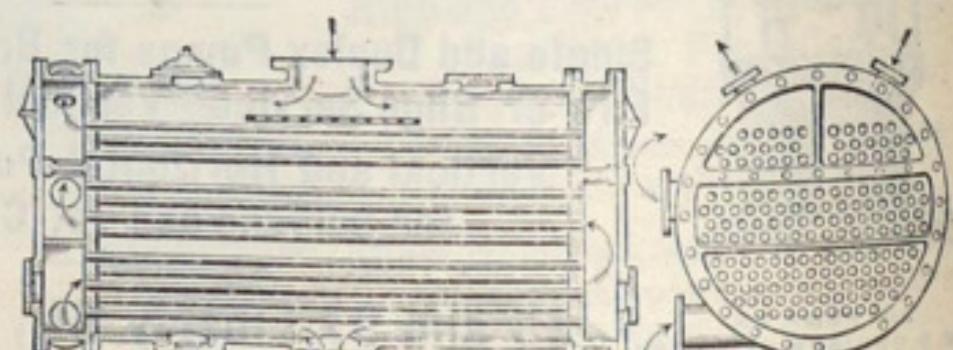
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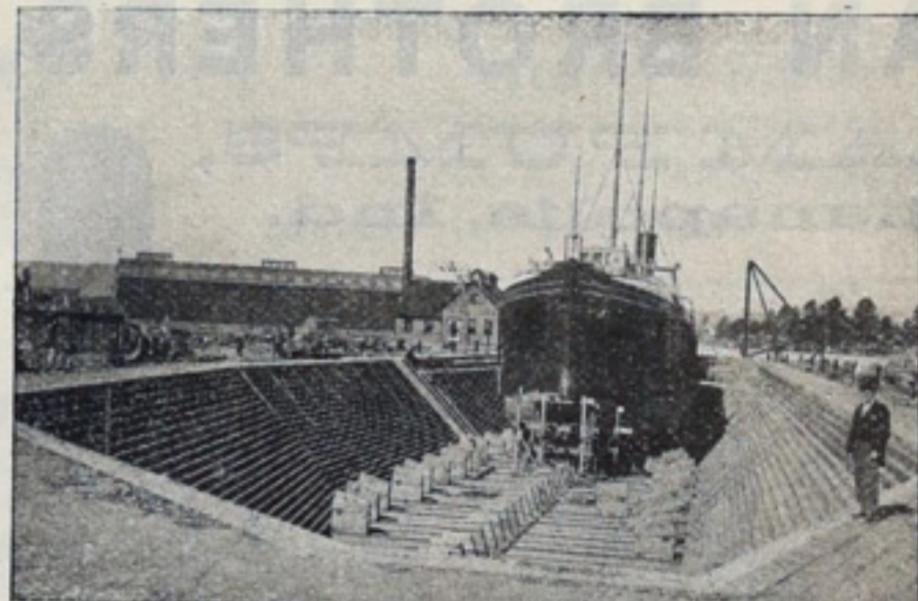
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